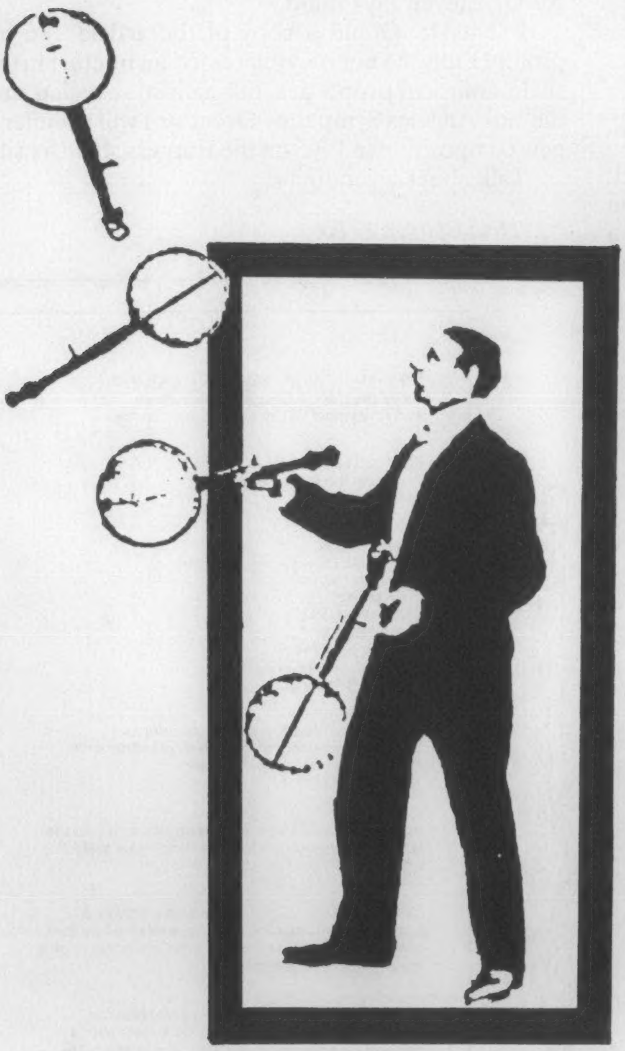
VOLUME 10 #3 MARCH 1995 PRICE $6

FOR THE DESIGN, CONSTRUCTION AND ENJOYMENT OF UNUSUAL SOUND SOURCES

EXPERIMENTAL MUSICAL INSTRUMENTS



IN THIS ISSUE

APACHE VIOLIN

— That's what the instrument is most often called, and it is indeed a bowed string instrument. But the Apache *Tsii'edo'a'tl* is quite separate from the European violin, both in its form and in its history. Among a relatively small number of makers and players who have carried the instrument into the present generation is Chesley Goseyun Wilson. He, along with Ruth Longcor Wilson and Native American music scholar Brian Burton, describe the making of an Apache violin in this issue of *EMI*. In addition this time around we have more on tubular metallophones, notes on aeolian music in ancient Chinese literature, the first in a series on bamboo cultivation for instrument making, further explorations of pyrophonia, and much more, including: *things you can try with too many banjos*, as shown at left. So open, and read.

Above: Mr. Franco Piper, juggler of banjos. See the article starting on page 27.

LETTERS

I WAS INTERESTED in the accounts of "unusual Earth Voices" in the Dec. issue of *EMI*, as I have been plagued for years by such a sound – this is a hum, apparently a simple sine-wave, right on the threshold of hearing, and invariably on the F just below the bass staff.

Until recently, I thought no one else was able to hear this, but a few weeks ago a friend reported to me that he too has heard this sound for years now, and it's been driving him nuts trying to figure out what it *is*.

I've tried without success to correlate it to weather-phenomena, etc., but its occurrence seems completely random – *e.g.* present for 2 months without cessation, then absent for half a year, then present for 2 hours one morning, then nothing for a week , and so on.

Since it's easily masked by other sounds, it's generally easiest to hear indoors in a quiet room – there's a remarkable amount of ambient noise outdoors even in the backwaters of Vermont – but I have heard it 30 miles from here, standing on an isolated dirt road.

I'd be *very* interested in knowing if anyone else hears this mysterious hum, and would especially appreciate an explanation of it.

Dennis Murphy
P.O. Box 47, Plainfield, VT 05667

PERHAPS *EMI* AND ITS READERS will be able to help me with a little project.

Although each person has his or her own definition (limitations) of the word *music,* I wonder if it's possible for a large group of people to have a common definition. I'd be interested in corresponding with anyone who would like to give me their ideas.

Roy V. Childs
Music Instrument Repair-Winds and Strings
17421 69th Ave., S.E., Snohomish, WA 98290-8359

THIS WEEK I RECEIVED a note and brochure from a Bell Collector living in Indiana, who heard our Chimes [Deagan Organ Chimes or Shaker Chimes, featured in recent articles in EMI] at our bell convention this summer in San Diego. She happened to visit an Antiques mall known as Alberts Mall, and the first thing she saw when they entered was a set of the "Shaker Chimes." Not for sale, but on display, and the owner, Mr. Albert, played several pieces for them. She secured a copy of the brochure and sent it to me because I mentioned that we listed the names of people who own sets, as we come across them.

This is what appears in the brochure:

The building that is our home and business was constructed for a manufacturer's display showcase in 1972. The 14,000 square feet Louisiana Colony house was completed at a cost of $443,000.00. The corporation involved in the business could not complete their original concept so the house sat empty until 1975, when Keith and Patti Alberts purchased it for their antique business ...

...Beginning on the right side, we have on permanent display, a set of Shaker chimes made by the Deagan Chime Company of Chicago, Illinois in 1892. They were used on the vaudeville circuit until the 1920's. The owner, Mr. Alberts *might* be persuaded to play a song or two on a Sunday afternoon. Each room has a varying theme as to age and style for your shopping convenience.

They are located one mile south of Nashville, east side of SR 46, between west park entrance and Little Nashville Opry in Indiana. The zip code is 47448.

I've written to ask them how they got their set of chimes and what history they have in regards to it. For many years, I thought I was probably alone in using them to entertain, but the list keeps on growing and growing.

Ellen Schultze

THE STORY ON USING BURGESS SHALE to make a xylophone (in the September 1994 issue by Priscilla and Barton McLean entitled "The McLean Mix muses upon the ultimate musical instrument") was of great interest to me as a musician and a geologist.

The world-famous, unusual 550 million-year-old soft-bodied fossils that are preserved in this shale and dwelt in an ancient sea were featured in a recent popular book "Wonderful Life" by Harvard professor Dr. Steven Jay Gould.

I sent Dr. Gould a copy of the article. In his prompt reply, he not only expressed an interest in the shale's musical properties, but he also revealed that the Los Angeles Symphony Orchestra will premier a new composition in 1995 on the Burgess shale fossils.

Talk about serendipity!

Miss Carolyn E. Fix

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SUBMISSIONS: Experimental Musical Instruments welcomes submissions of articles relating to new or unusual musical instruments. A query letter or phone call is suggested before sending articles.

SOUND DESIGNS, the classic 1980 book of home-buildable instrument designs by Jon Scoville and Reinhold Banek, will be reissued in a revised and updated edition this Spring by the original publisher, 10-Speed Press in Berkeley, California. This book stands as one of the standards of the genre. It was one of the important early inspirations for *Experimental Musical Instruments*, and it will be great to have it available again. If you didn't get it before, here's another chance.

A NEW MAIL ORDER CATALOG devoted to unusual and hard-to-find instruments has been created by Mandala Percussion. A sampling of instruments included: Trine – a multiple triangle, capable of a range of triangle sounds from a single rod with multiple angle bends. Ocean Drums: ocean-like sounds from pellets rolling on drum membranes. Sizzle Strip – if you've ever fooled around with thin, free-swinging ribbons of hard metals, you'll have some sense of the possibilities in this one. Fahringer Slap-a-phone: tunable percussion aerophone sets in a handsome modular layout. Udu drums and Waterphones – these have been described in earlier issues of *EMI*. Pictures and written descriptions of the instruments are included in the catalog, along with several sidebars and blurbs on music-related topics. The catalogue is available for $2 from Mandala Percussion, 1390 South Potomac St., Suite 136, Aurora, CO 80012.

STRINGMASTER, a DOS software package for string scaling, is now available from Mark Bolles at 1405 Little Leaf, San Antonio, TX 78247. It is designed primarily for harp string calculations, but it is flexible enough to use for essentially any instrument using standard stringing materials. Stringmaster guides the user to optimal string scalings for a given instrument, doing all the string length, diameter and tension calculations. It can do the calculations for nylon, steel and bronze strings, as well as overwound strings in types and sizes the user can specify. *EMI*'s editor – that's me – was one of the beta testers for this software. In one respect I was a good choice for the job: I don't have much experience with harps, and I'm not one of those natural born computer types ... in other words, I'm a non-expert. I was a little slow to get comfortable with the procedures, but when I did find my way through I found Stringmaster's recommended string scalings to be excellent. Heaven knows it saved me a lot of time compared to trying to learn the math and do all the calculations for a many-stringed instrument or, alternatively, settling on string diameters by trial and error. So – thanks to Mark Bolles for coming up with a genuinely useful piece of software.

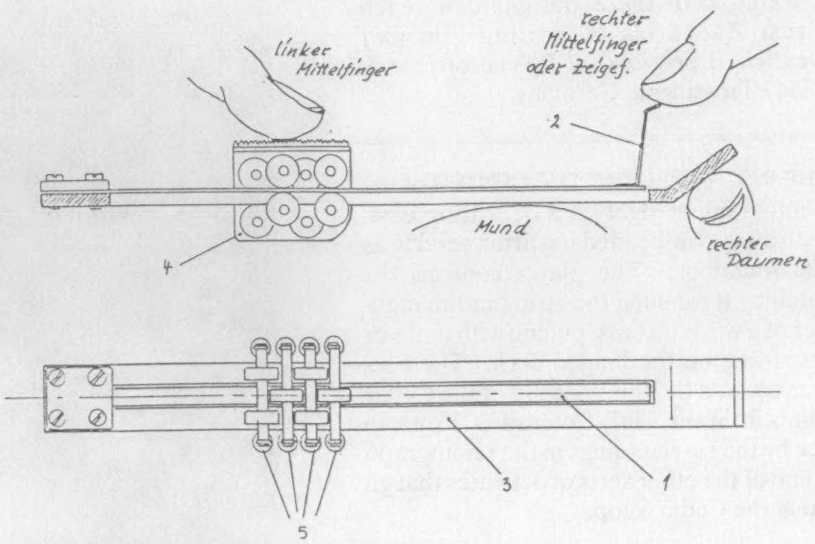
A VARIABLE-PITCH JAW HARP – One of the many and diverse works from instrument designer Ernst Zacharias:

EMI has recently had some correspondence with the German musical instrument designer Ernst Zacharias. Communication has been limited, with language barriers presenting a considerable obstacle, but there has been enough to pass on some intriguing information and ideas.

The exchange was initiated when the German intonational theorist Prof. Dr. Martin Vogel sent to EMI some drawings for Herr Zacharias' unique tunable jaw harp, shown below. Working prototypes for this instrument exist, but it has not been produced in quantity. The instrument operates, in principle, much like a conventional metal-frame jaw harp (though the frame is differently shaped), with this difference: there is a runner, something like a tiny railroad car, mounted on the tongue of the jaw harp. The runner holds the tongue very firmly, and serves to define the base point for the vibrating tongue length. The player uses one finger of the hand that isn't busy plucking to move the runner to different locations along the tongue, thus varying the tongue's vibrating length and controlling its fundamental pitch. With a normal jaw harp, the fundamental pitch of the tongue provides a constantly sounding drone pitch, while the player brings out different overtones above by altering vocal cavity shape. With the Zacharias harp, you can use the runner to adjust the drone pitch for playing pieces in different keys, or you can move the runner about even as you play, to open up a broader range of harmonic and melodic territory.

Part of the design challenge here is to make the runner hold firmly enough to provide the tongue with a solid base from which to vibrate, yet still leave the runner free to move fluidly up and down the tongue under the player's control. Herr Zacharias has achieved this by giving it six wheels on the front and six wheels on the back, pressing firmly on the tongue and frame from opposite sides. On each side, as shown in the drawing, there are four wheels riding on the frame alongside the tongue, while two ride on the tongue itself. He mentions that he has considered design improvements that would allow the runner to travel more freely on the tongue, as the action on existing models is a bit stiffer than he would like.

The variable-pitch jaw harp is but one of Ernst Zacharias'



Variable-pitch jaw harp design by Ernst Zacharias

musical instrument designs. Some of the others have been far more celebrated. Most of Zacharias' work has been with the Hohner company in Trossingen, Germany. Hohner was founded in 1857, primarily making the well known Hohner harmonicas and accordions. Hohner designers contributed significantly to the development of these instruments over the years. After the second world war Hohner began making more keyboards, as well as some more adventurous designs (their now-rare electro-acoustic plucked lamellaphone called *guitaret*, for instance). During this time electronic and electro-acoustic techniques played an increasing role in Hohner's product line. Ernst Zacharias joined the company in 1954. In the early 1960s he designed or co-designed two instruments for Hohner that were to have substantial impact, particularly in rock and jazz: the *pianet* and the *clavinet*. The pianet was an electro-acoustic keyboard lamellaphone, with tuned tongues sounded by an unusual sort of plucking system. Vibration in the tongues was picked up by electro-magnetic pickups and sent to an amplifier and speaker. The clavinet employed short, hammer-struck strings, also electrically amplified. Everyone reading this, I'm sure, will have heard the clavinet sound featured prominently in recordings by Stevie Wonder, Chick Correa and others.

Zacharias can claim several additional inventions, holding German patents independent of Hohner for organ valve mechanisms and voicing systems, a sensor-controlled wind instrument keying system, and a clavichord resonating arrangement. He's even produced an advanced electric bicycle design (for getting places; not for playing music).

Makers who might be interested in working with these designs can reach Ernst Zacharias by writing him (*auf Deutsch*, if possible) at Belchenstrasse 5, 78647 Trossingen, Germany.

THE INSTRUMENT AT THE CENTER of the photograph at right is a one-string bass, with a big skin-headed log drum serving as the soundbox. The player controls the pitch by tensioning the string in the manner of a washtub bass, pulling with more or less force on the hinged neck. The bass was created by Ken Wisecup of the Cedar Shop in Silver Cliff, Colorado. You can see by the surroundings in the photograph some of the other sorts of activities that go on at the Cedar Shop.

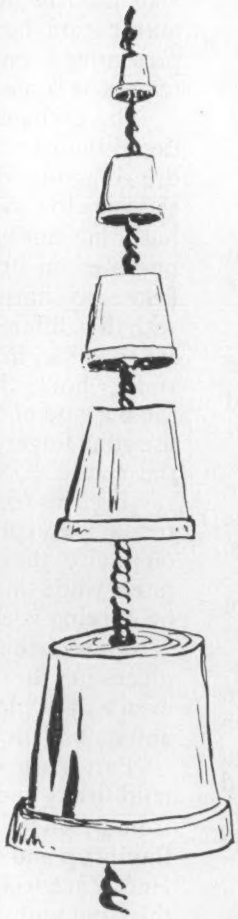


Photo below: Ken Wisecup's log drum bass.

MORE *EMI* BACK ISSUES NOW AVAILABLE IN BOUND SETS

We have made an effort to keep all back issues of *Experimental Musical Instruments* available for purchase, since the contents from our very first issue on down remain valuable for anyone interested in the wide world of possible musical instruments. As the original press runs of earlier issues have sold out, we have offered reprints in bound sets, with each set containing all the issues of one volume year in photocopy. Volume sets for volumes I-V have been available for $17 per volume for some time now. Lately, due to some not-so-great decisions on how many to print, we have been selling out the later issues quite rapidly as well. As a result, the issues of Volume VI and later have now, like the earlier ones, been bound into photocopied volume sets at the same price, and are no longer available singly. Here's the overall picture:

The issues of *EMI*'s volumes 1 through 9 (plus Volume 10 after September 1995) will be available in photocopied, bound volume sets, each set containing one year's worth of *EMI*, at a cost of $17 [CA residents add 7.25& sales tax; for overseas air add 20%]. Single back issues are no longer available (with a few exceptions on a hit-or-miss basis).

The photocopies are a step down in quality from the original press runs, but they are quite readable still.

This is a good opportunity to pick up on whatever portions of the great body of information that is *EMI* you may have missed. Order those back issue sets – they're not as nice as the original press runs, but they are correspondingly less expensive, they are certainly convenient, and they're here, available and waiting for you. Order from Experimental Musical Instruments at PO Box 784, Nicasio, CA 94946.

BRIEF NOTE: The special set of reviews devoted to nature sound cassettes and CDs which was to have appeared in this issue has been delayed; it will appear in the next. Esther comes first.

[Esther is reviewer René van Peer's newborn daughter, who has been demanding much of the time that would otherwise have been spent writing the reviews.]

THE ALFALFA VIOLA

by Hal Rammel

I first learned of Grant C. Haium's Alfalfa Viola in a reprint of his patent published in 1976 in **Mugwumps: The Magazine of Folk Instruments** (Volume 5 #2, Sept-Oct 1976). A bit of research turned up the information that follows, including Grant Haium's name for his instrument which is not included in his patent application. With a nod of appreciation to George Haium and the editors of **Mugwumps**, we know at least this much of Grant Haium's unique rustic revelation.

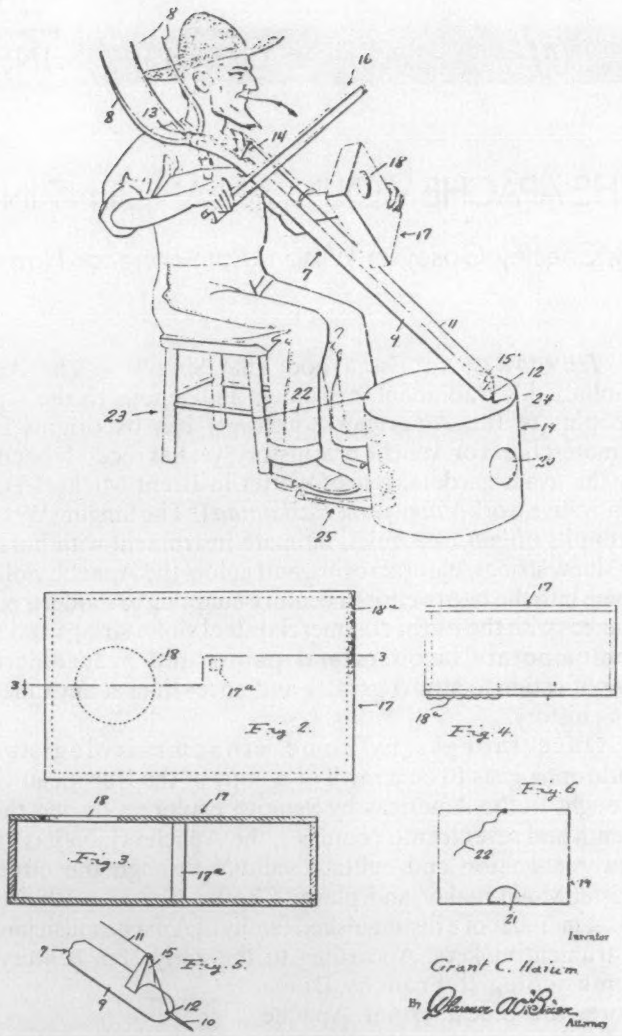
The single-string alfalfa viola was created by Grant C. Haium of western Wisconsin in the 1920s. According to nephew George Haium, Grant was the baby boy of a farm family of nine children. He began life farming but quickly turned to (and seemed to prefer) living hand-to-mouth playing his own invention, the alfalfa viola (the only instrument he played). George Haium reports that it never took much urging to get him to play. He performed a lot during the Depression, mostly for free, but also played frequently at a big auditorium barn dance in St. Paul, Minnesota, often as a duo with his daughter playing Hawaiian-style guitar. Grant Haium died in 1952. No remnant of the instrument remains, but according to George Haium: "if the instrument has some antique value I could build you one real quick."

Grant C. Haium received a patent on his single-string three-tined pitchfork with lard can and cigar box resonators in 1936. He writes in his 1934 application:

Being an innovation, and in fact, somewhat of a rustic revelation, the structure will be found notable as a unique contribution to the art and trade in that it may be justly accredited as possessing the attributes of an irregular yet practicable stringed musical instrument which though of a limited tone compass is nevertheless usable, in the hands of an artist, to promote achievement not of a renowned type, but rather of a captivating and humorous character calculated to appeal to a listener moved by the efforts of a humble performer.

No information exists as to the genesis of Haium's "rustic revelation," however, it does not seem far-fetched to conjecture that it may have been in part inspired by Mussehl & Westphal's Musical Pitchfork (see *EMI*, March 1994) or that these two instruments shared some common point of inspiration in similar novelty instruments in vaudeville bands touring the mid-west in the early part of this century. In reverse of the Musical Pitchfork, Haium turned the pitchfork upside down so that the tines became "a convenient means for resting the handle or shaft on the shoulder of the player." A relatively high two-inch bridge sat adjacent to the fork-head and a second shorter one-inch bridge was fixed at the opposite lower end. Haium simply wound a single length of piano wire around the middle tine at the high end and around an anchoring nail at the other end "drawn sufficiently taut so that it will vibrate through the instrumentality of the hairs on the violin bow." The alfalfa viola utilizes two separate resonators. The first is a simple cigar box with its lid nailed shut and a sound hole cut in the top that acts both as a "sound wave amplifying unit" and as a sliding pitch regulator "somewhat in the nature of a slide such as is employed on a Hawaiian steel guitar."

The text of the patent indicates that the second resonator evolved as a rest or base for the low end of the pitchfork. Haium used a large lard can. A "toe hole" was cut into one side of the can so it could be held down with the foot and kept from sliding. A sound hole was cut into the opposite side and a small nail-sized hole was punched into the far side of the top (the base of the upside-down lard can) to accommodate the anchoring pin in the end of the fork handle, all serving to fix the parts of the instrument securely during performance. This lard can could also be used as a bass drum for rhythm accompaniment with the simple addition of a drum pedal (with string connecting the can to the leg of the player's chair).



Drawings from Grant C. Haium's Patent #2033826, March 10, 1936.

While it is clear from the patent application that Hauim was careful to maintain certain visual associations in the design of his instrument ("it may be said to be of the homely or rural type ... in what may be designated as a performance of the 'Hill-billy' type"), he remained attentive to and not unsatisfied with its musical possibilities. "The structure as a whole is not calculated to be possessed of a resplendent and appealing tone capable of adequate comparison with legitimate musical instruments of the violin family."

At the same time, notwithstanding the use of a single string, it has been found that the structure, in the hands of a capable performer, is responsive and susceptible of producing a tone quality similar to that of a cello. In fact the pitch may range from the lower compass of the violin to the upper or medium compass of a cello. Under the circumstances the quality of the tone produced is sufficient to excite human and modest interest such as would be expected to reside in the average patron or listener attending a moving picture show or equivalent stage performance.

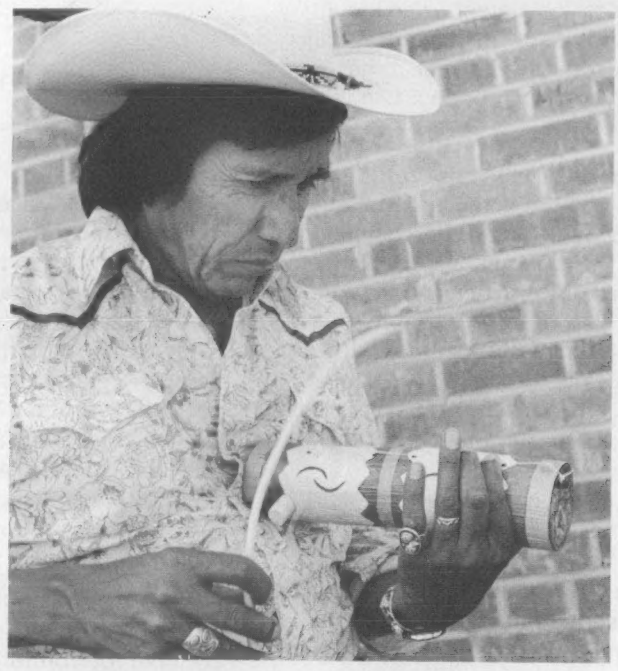
THE APACHE VIOLIN: AN ANCIENT INSTRUMENT MOVES INTO A NEW CENTURY

By Chesley Goseyun Wilson, Ruth Longcor-Harnisch Wilson, and Bryan Burton

Tsii'edo'a'tl – "The Wood That Sings" – The Apache Violin... this traditional instrument indigenous to the Apache peoples of the American Southwest has its origins in the remotest times of Apache oral history, yet has recently been used by the avant-garde Kronos Quartet in Brent Michael David's innovative work *Mtukwekok Naxkomao* ("The Singing Woods"). From its origins as a quiet, intimate instrument with horsehair or sinew strings, natural rosins, and colors the Apache violin has come into the late twentieth century adapting to modern performances with the use of commercial steel violin strings and rosin, contemporary lacquers and paints and even electronic amplification to attract greater audiences than at any time in its long history.

Once thought by some ethnomusicologists and anthropologists to be a myth or a copy of the European violins brought to the Americas by Spanish explorers during the sixteenth and seventeenth centuries, the Apache violin has gained new recognition and cultural validity through the efforts of master violin maker and player Chesley Goseyun Wilson, the latest member of a distinguished family of Apache musicians and instrument makers. According to the early 20th century ethnomusicologist Frances Densmore, the oldest extant Apache violins in museums and collections date back only to about 1875 with other early documentation coming in letters, diaries, and photographs by settlers and soldiers in the late nineteenth century. However, because of the natural materials used in making the Apache violin, earlier instruments would have "biodegraded" in the course of time, an argument frequently cited by Apaches to explain the lack of prehistoric instruments. Apache oral tradition places the origins of the instrument "at the beginning of the earth".

Other claims for recent origins have included the story that certain Apaches began to make the instruments just for sale to tourists coming through Arizona on railroads. This is easily disproved by considering that photographic and journal evidence of the instrument's existence predates the arrival of the railroad in Apache territory by several decades.



Chesley Goseyun Wilson plays the Tsii'edo'a'tl, or Apache Violin.

Photo courtesy of Arizona State Museum, University of Arizona.
Helga Teiwes, photographer

The very structure and appearance of the Apache violin seems to argue against a European model: the body is cylindrical and only one string is found on traditional instruments. Chinese ethnomusicologist Za M Su believes there is a strong connection between ancient Mongolian culture and that of the Athabascan tribes of North America and cites the stringed instruments as one example. A more striking comparison between Asian and Apache stringed instruments may be made between the Apache violin and the *chengni* – a cylindrical instrument with from one to four strings played by a curved bow made from a small tree branch. A visual comparison of the Yaqui, Mayo, and Tarahumara violins which closely resemble European violins – shape, scroll, tuning pegs, number of strings – with an Apache violin is perhaps the simplest argument in favor of an Apache original design.

In Apache culture, the Apache violin is unarguably accepted as an authentic instrument created within the traditions of the tribe. The instrument is not referred to as a "violin" by the Apache, but is instead simply *tsii'edo'a'tl*, "the wood that sings" in reference to its sweet, delicate tone which some describe as cross between that of a flute and a dulcimer (quite a contrast from early observers' comments such as "sounds like a cat with its tail caught in a fence"). An earlier researcher refers to the instrument by the name *ki'zh ki'zh di hi* – "the buzz buzz sound". Some contemporary Apache, however, think this may have been told to this man in jest. The term "fiddle" is considered offensive by the Apache and is seldom used to describe the Apache violin.

The Apache violin is used for playing many types of music including social dance songs, ceremonial songs, corn beer drinking songs, and improvisations for the instrument. Another use of the instrument is in healing rituals – no less a figure in Apache history than Geronimo made and played the Apache violin. (Some modern instruments are patterned after those made by Geronimo. Arizona State Museum Apache specialist Diane Dittemore states that a violin said to have been made by Geronimo is in the Peabody Museum collection at Harvard University.)

Among the most famous makers of the Apache violin was Amos Gustina, an uncle of Chesley Wilson. His instruments varied in size from 40 to 67 cm in length and occasionally used two horsehair or sinew strings. Many were elaborately decorated and have been collected by individuals and museums. (A large example is in the Arizona State Museum collection.) Instruments by Gustina

earned many awards at fairs and expositions and authenticated Gustina Apache violins are highly prized. Most contemporary instruments are considerably smaller than those made by Gustina – generally about 40 cm in length. Alan Ferg sketched Gustina's biography and instrument making techniques in "Amos Gustina: Apache Fiddle Maker" in a 1981 issue of *American Indian Art Magazine.* Photographs of several of Gustina's instruments may be found in this article.

Upper photo: Two agave plants shortly before blooming, Redington Pass area. Chesley Wilson looks on.

Lower photo: The cut agave stalk, showing the pithy interior. Chesley Wilson cuts a length suitable for two violins.

Photos courtesy of Arizona State Museum, University of Arizona.
Helga Teiwes, photographer

FROM AGAVE TO APACHE VIOLIN

The Apache violin is made from a section of the century plant *(Agave Americana)* which grows in abundance in southern and eastern Arizona. This plant is an agave and blooms only once (after 15-20 years of growth) before scattering its seeds and dying. The single twelve- to twenty-foot stalk growing from the center of the plant is the source of the body of the Apache violin. The century plant also furnishes the Apache with food, drink, and fibers.

A section of the stalk is carefully selected and cut to size. It is then hollowed out, end plugs replaced, tone holes cut into the body to focus the sound, a tuning peg inserted through two holes at the base of the instrument, a string wound around the tuning peg, and attached to the end of the instrument. A small bridge keeps the string from buzzing against the body. Decorations range from simple traditional patterns and colors to contemporary acrylic colors and special designs according to the taste of the person for whom the instrument is made. At any point during the often two or three month long process of creating an Apache violin, some flaw may be found in the stalk, a crack may develop, or a layer of sealant dry incorrectly requiring the maker to start the entire process from the beginning with new materials.

"There are a few young guys who are making cheap violins to sell at markets to the tourists. Too many use inferior stalks or skip steps along the way in their hurry to make the instrument. Sometimes the string rests completely against the body or they only paint on the tone holes!! These instruments sometimes don't last until the buyer gets them home. The people who make them the traditional way know that a good violin can't be hurried along. Quality takes patience." — Chesley Goseyun Wilson.

The bow is made from a short, bent branch (usually from willow or sumac) with horsehair attached for playing. The string, originally horsehair or sinew, is now frequently a commercial violin string. Resin is sometimes used on the bow or a "glob" of pitch may be placed on the end of the violin *for* the convenience of the player.

The Apache violin is played by placing the wide end against the chest and stopping the string with the fingers of the left hand while the bow is drawn across the string. As with any instrument, the tone quality varies according to the taste and skill of the player. In the hands of a skilled performer, the Apache violin is a delightfully entertaining instrument. It shows the versatility of the Apache culture in producing a fine instrument using the materials and tools placed in their lands made perfectly for them by Yusen the Creator.

TWO APACHE VIOLINS

Two instruments made for the author by Chesley have the following dimensions and characteristics:

VIOLIN I – (See sketches)

Finish: tan, natural

Length: 38.4 cm

Width at end: 5.6 x 5.2 cm oval shape

Width at top: 5.1 x 5.0 cm circular shape

Tone holes: 2.4 x 1.3 x 1.3 cm triangular shape centered on body beginning 8.4 cm from top; 2.1 x 1.4 x 1.4 cm triangular shape on each side of body beginning 8.4 cm from bottom. Each tone hole is outlined with a flat black paint

Peg: 13.7 cm length wooden peg inserted into 1.7 (entry) and 1.2 (exit) hole beginning 3.0 cm from top

String: Violin "e" string inserted into centered hole 5.2 cm from top extended over natural curve of top and tied to 1.0 cm end pin inserted on bottom of violin. String is tightened/loosened by turning peg. Marks are placed on peg to prevent overly tightening the string and splitting the instrument. Small flat, rectangular pieces of wood are placed near the string hole and end pin to elevate the string above the body of the instrument to prevent the string from vibrating against the body.

Open string pitch: "D", fourth line, treble clef

Decorations: Small sun symbol, yellow, red outline and four red rays beginning 2.0 cm from end; black crescent-shaped winds spirit ("four directions") symbols on either side of body beginning 13.0 cm from top; black mountain symbols (tree "peaks") down top center of body beginning 11.8 cm from top and ending 12.2 cm from bottom; 23 cm feather attached to end with 8 cm chestnut color leather strap and decorated with one piece of turquoise and one piece of white shell; CW monogram on top.

VIOLIN 2 –

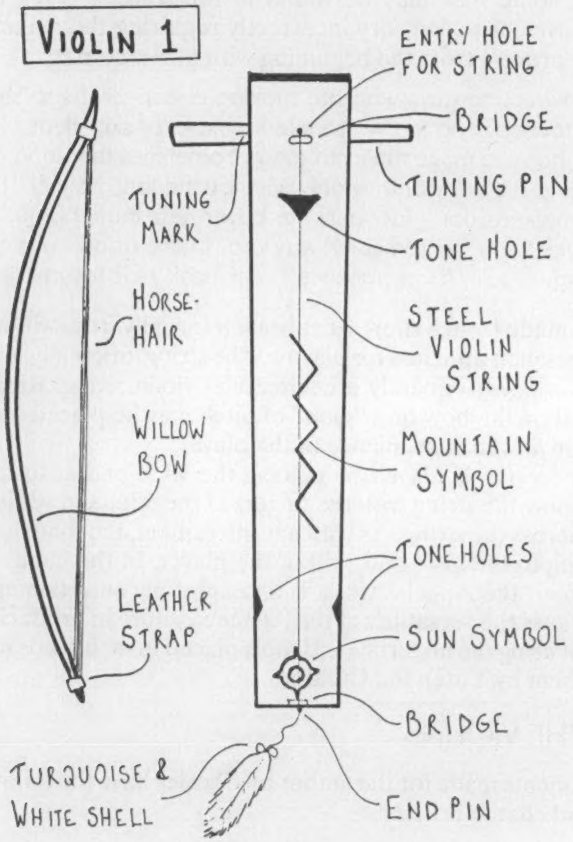
Finish: chestnut/reddish brown lacquer

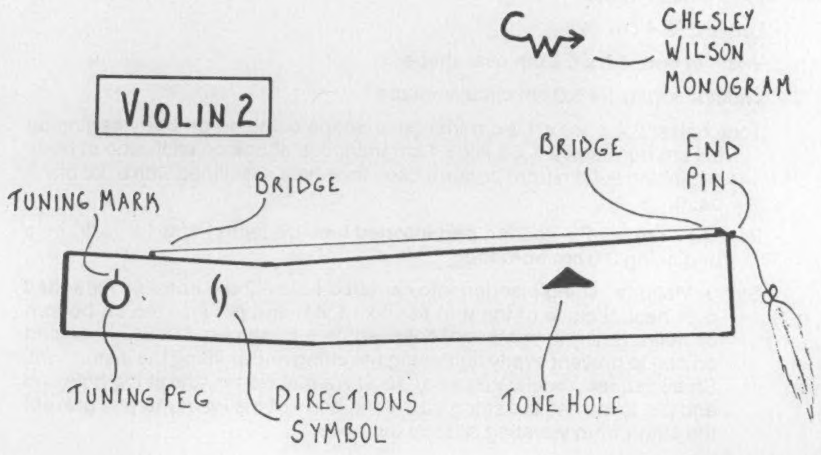
Length: 37.2 cm

Width at end: 5.0 x 5.6 cm oval shaped

Width at top: 4.5 x 5.1 oval shaped

Tone holes: 2.3 x 1.4 x 1.4 cm triangular shape centered on top of body beginning 8.5 cm from top, Two 1.0 x 1.0 x 1.8 cm triangular shape on sides of body beginning 8.0 cm from end, tone holes are outlined in flat black paint.





Peg: 14.2 cm peg inserted into hole (1.7 cm entry, 1.5 cm exit) beginning 4.0 cm from top, black marks are painted on peg to prevent overly tightening string

String: Steel violin "e" string inserted into centered hole 5.9 cm from top extending over natural curve of body and tied to 0.8 cm end pin inserted into end, two small rounded pieces of wood are placed at the end pin and string hole to elevate the string above the body of the instrument and prevent rattling.

Pitch: "F" top line treble clef

Decorations: black crescent-shaped "wind spirits" symbols on either side of body beginning 6.0 cm from end, black mountain symbols (narrow) beginning 12.0 cm from top and stopping 15.0 cm from end, thin black trim on top and end; CW monogram on top, 18.0 cm feather attached to end with 11.0 cm white leather strap decorated with one piece of turquoise and one piece of white shell.

CHESLEY REMINISCES ABOUT LEARNING TO MAKE THE APACHE VIOLIN

Following the death of his mother, Chesley spent several years living with his uncle Albert Goseyun, another distinguished maker of Apache violins, and assisted Goseyun and Gustina in their work. Upon his father's remarriage, Chesley moved back to family and continued learning traditional Apache crafts and music.

I was probably five or six when I started watching them — how they make and how they play the violin. I was probably ten years old when I tried to put one together.

Chesley Wilson spent his childhood observing his uncles Albert Goseyun and Amos Gustina making traditional Apache violins. (In Apache style, he refers to them as his "grandfathers".) In addition to learning the craft of violin and flute making from two acknowledged masters, he began to learn the vast repertory of songs and dances from the Apache culture. When he returned to Tucson in the early 1980s, Chesley began to make violins and flutes copying the instruments of his "grandfathers".

Making a violin begins with the search for a suitable century plant stalk. It must be dried to the point of having a dark reddish skin color with a slightly gray surface coat. The stalk must be inspected for insect damage or other potential bad places on the stalk. If the stalk is too green, a toxic reaction from fluids may occur and stalks which are too brittle will break too easily when they are worked.

After a stalk is selected, Chesley must saw several sections from the plant to be used for violin bodies. He must work carefully to avoid injury from the spiny dagger-like leaves near the plant's base. It may take several hours to accumulate about a dozen sections of appropriate quality and size. Occasionally, an entire day's search may be fruitless.

After the sections are brought home, they must be thoroughly dried before the actual work of making the violin begins. After removing the outer bark (revealing a tan wood), the pithy interior of the stalk is cleaned out either by using a long knife or splitting the section in half and scraping out each half. If the section is halved, each half must be carefully sanded and shaped so they halves may be rejoined without leaving a crack in the body. Following these steps, the parts are glued together and wooden caps glued onto the ends of the violin body. Sections of the stalk which have not been hollowed or appropriately shaped pieces of balsa wood may be used for the caps, but Chesley uses a high-quality plywood. This phase of construction may take several weeks.

Sound holes are carved into the body to focus and enhance the sound of the violin serving the same function as "f holes" on the European violin. These holes are traditionally round, triangular, or diamond shaped. Another hole is drilled a few inches from the larger end of the body for placement of a tuning peg

made from cottonwood or willow. A string – frequently a commercial violin string – is wrapped around the peg which is then twisted to bring proper tension to the string. The string stretches across the top of the violin, over a tiny bridge, and attaches to the small end of the body. The natural curve of the stalk is used to determine the best placement of the string to prevent buzzing against the body of the violin and make fingering easier when playing.

Traditional or contemporary designs decorate the now completed body of the violin. "I use traditional Apache symbols and colors. I use the four direction colors (black = east; yellow = west; white = north; blue or green = south)." Any color, however, may be used. Some museums and collectors prefer the softer "weathered" colors of violins made in the last century, but more vivid colors are more commonly used on instruments made for the public. Other symbols include a circle to represent the sun, a sawtooth pattern to represent mountains, crescents to represent the wind spirits. Sometimes, Chesley adds hummingbirds, clouds, water, or special designs to the bodies of the violin. A feather is often tied to the violin and decorated with symbolic turquoise and shell.

At least two coats of enamel paint and several layers of a sealant are used to enhance resonance. Construction of a quality Apache violin may take as much as two or three months.

The violin bow is made from a willow branch (bark removed) which is bent and tied when wet to give it the proper shape. The inside of the bow is slightly flattened. Horse hair is attached to the dried bow with bits of leather.

Simple violins are sold for a few hundred dollars with more elaborately designed or customized instruments priced accordingly. Chesley's fine violins are used by many Apache performers and are sought by collectors and teachers. Instruments have been made for museums (including the Smithsonian Institution) and movie production companies, and a set was commissioned by the Kronos Quartet for a special work featuring Apache violin.

On both self-recorded and commercially made recordings, Chesley Goseyun Wilson performs violin versions of several traditional Apache songs. Included are "Blessing Song," "When I Was Young," and "I'll Go With You." The notated melodies found in the World Music Press publication *When The Earth Was Like New* (Wilson, Wilson, Burton) are pitched for an instrument using a modern "e" string. Listeners should carefully observe and identify differences between the notated versions, the vocal versions performed also performed by Chesley, and violin versions. Because of the tradition of improvisation, there will be variants from performance to performance. In addition, microtones are produced on the instrument due to the limited space for finger placement on the instrument. Pitch bending frequently occurs as notes are adjusted or as the fingers go farther up on the string requiring the string to be pressed down a greater distance. These inflections are characteristic of Apache violin music.

Mohican composer Brent Michael Davids' recently completed *Mtukwekok Naxkomao (The Singing Woods)* will be included on an upcoming album by the Kronos Quartet. This unique work not only incorporates Native American melodic fragments, but requires performers to use an Apache violin, rattles, bull roarers, and bows of various materials. The score is a beautifully hand-drawn work using graphic representations of musical and programmatic themes. The Kronos Quartet premiered *Mtukwekok Naxkomao* in Scottsdale, Arizona, March 18, 1994, with the composer and Chesley Wilson (who made the traditional instruments for the quartet) in attendance.

The Apache violin, whether in the hands of a master such as Chesley Wilson or classically trained members of a contemporary ensemble such as the Kronos Quartet, shows the durability of an ancient tribal instrument which has adapted well to each new audience and promises to continue to exist for many, many generations.

The final stage: decorating the instruments.

Photo courtesy of Arizona State Museum, University of Arizona. Helga Teiwes, photographer

Chesley Goseyun Wilson, Eagle Clan Apache, is a singer, maker, and player of traditional Apache violins and flutes. In addition, he is a silversmith, woodcarver, painter, storyteller, model, and actor. Chesley is a frequent singer and dancer in Apache ceremonies held on the San Carlos and Fort Apache Reservations in Arizona and is considered an expert on ga'an (Mountain Spirit) ceremonies.

Ruth Longcor-Harnisch Wilson, of mixed Native American and Euro-American descent, is a teacher, musician, folk dancer, and bio-cultural anthropologist. She has served as health and human services administrator for various Native American tribes and urban organizations. Together, Chesley and Ruth Wilson have performed at innumerable museums, schools, churches, cultural fairs, and Native American gatherings throughout the United States.

J. Bryan Burton, of mixed Native American and Euro-American descent, is Associate Professor of Music Education at West Chester University of Pennsylvania where he specializes in multicultural music education. His work in this field has taken him as researcher and lecturer to locations throughout east Asia, North America and Europe. He is the author of Moving Within the Circle: Contemporary Native American Music and Dance *(1993).*

Professor Burton and the Wilsons have most recently collaborated on the book When the Earth was Like New *(World Music Press, PO Box 2565, Danbury, CT 06813), a collection of Apache songs and stories.*

Chesley Goseyun Wilson's discography includes:

Apache Eagle Dreams Eagle Clan Recordings 001, (Eagle Clan Music, 333 South Alvernon, Tucson, Arizona 85711,phone 602/881-4842)

The Singing Winds Eagle Clan Recordings 002

When the Earth Was Like New World Music Press 015, World Music Press (P.O.Box 2565, Danbury, CT 06813, phone 203/748-1131)

For further information on performances & workshops, or purchase of violins, flutes & recordings, Chesley & Ruth Wilson can be reached at 333 S. Alvernon #60, Tucson AZ 85711-4167. For queries relating to Native American music and instruments in general, contact Professor Burton at 39 Webb Rd., Chadds Ford PA 19317.

MORE TUBULONIA

You may have seen in EMI's last issue a pair of articles entitled "Metallophone Construction" and "Tubulonia." They were devoted to the eminently buildable, affordable and practical instrument sometimes called the tubulong, *being a set of tuned metal tubes mounted marimba-style for playing with mallets. We follow now with further information from three builders who have made such instruments. Much of the emphasis this time around (though not all) will be on extensions of the basic idea — approaches that will allow you to create more advanced or imaginative instruments from the tubes. We start with —*

CONDUIT

by Stephan Golovnin

Due to the recent flurry of writings on the metallophone-of-conduit that has appeared in these pages, I have been inspired to once again set pen to paper and "do reportage" on what I've come across in my musical wanderings.

An article appeared in *EMI* (Vol. 2 #1, June '86) on some instruments I had built, two of them made out of steel conduit. I will repeat some of that information here plus make additional comments and observations.

I have made conduit marimbas* since the late seventies in various tunings (both just and equal tempered) and with various tube sizes, specifically 1/2", 3/4", and 1". To my ear the 3/4" EMT has a superior sound over the others and I soon learned to rely on it exclusively. 1" tubing will bring out a stronger fundamental in the lower registers and 1/2" tubing has a clearer sound in the upper limits, but if I had to choose one size for best overall sound and largest usable range, 3/4" EMT wins hands down.

The next most important consideration for sound quality is the suspension of the tubes. Most systems work well enough as long as you put care into what you're doing. The difference between different methods of suspension has more to do with aesthetics or functionality than acoustics. In other words, it's easy to do it right and all the different suspension methods sound equally fine.

Thirdly, having a hard reflective surface 1 ½" to 2" underneath the notes will provide an increase in volume and perceived sustain as well as bringing out the fundamental.

Fourthly, having your reflector function as a radiator as well will improve the overall sound. This is done by raising the reflective bottom off the floor or table by another inch or two. Consider for a moment the back plate of an acoustic guitar. It acts as a hard reflective surface, yet due to it's thinness, it vibrates with the string vibration and radiates the sound, much less than but similar to the action of the soundboard on front. Holding the guitar against your chest as you play will dampen the sound, holding it away from your chest will allow it to sustain longer and with a fuller tone (see figure 1).

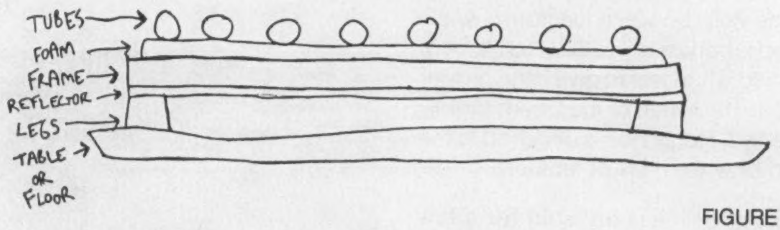


FIGURE 1

Fifthly but not leastly, you can put resonators under your tubes, individually tuned to each note. This is especially helpful in the low end as it brings out the fundamental tone quite well. The resonators can be offset so they all fit. I find that 2" plastic pipe provides enough resonating power for the amount of air being pushed a 3/4" tube (see figure 2).

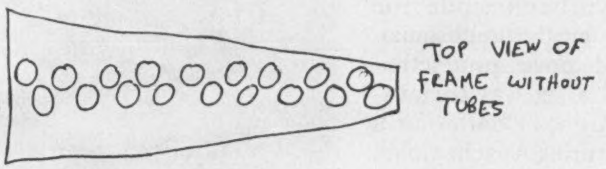


FIGURE 2

With resonators, you can easily take 3/4" EMT down to middle C with full clarity. Without resonators, G_4 is a good lower end (G above middle C.) At the upper end, 3/4" EMT rings clear up to C_7, perhaps higher.

I have tried many different methods of suspension and have come up with one that kicks butt over all the others. (Don't all instrument builders think that their way is best?)

First measure off your nodes lines, decide on the spacing between notes, and set 2-by-2s in place (see figure 3). There may be some slight compromise as the line will not be straight but it's not enough to make a difference.

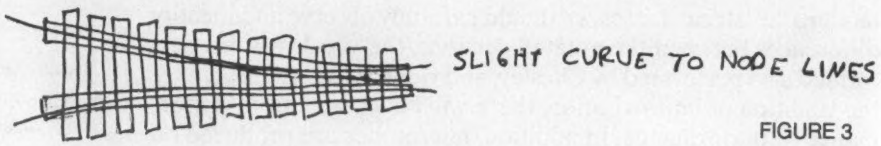


FIGURE 3

Between each note drive in a scaffolding nail (sometimes called a duplex nail) to a consistent depth.

Using 1/8" shock cord (thin bungee cord, available from any mountaineering store), wrap one turn around each nail allowing a bit of stretch all the way down and back again. This gives you two stretch cords at each node to slip the tube in between (see figure 4).

*I prefer the term conduit marimba over tubulong. I dunno, it just seems to ring more... (with all due respects to Erv Wilson, my long time friend and microtonal guru.

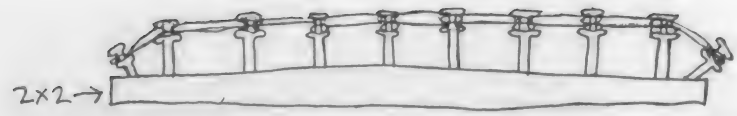


FIGURE 4

Insert all the tubes and attach end pieces to the 2-by-2s to hold them in place (optional.)

Attach a 1/4" piece of plywood or masonite to the bottom of the frame to act as a reflector.

Add 1 1/2" legs to allow the reflector to be a radiator as well (see figure 5).

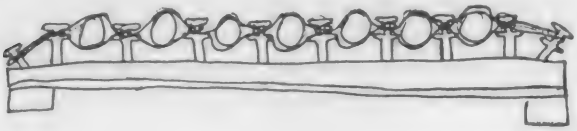


FIGURE 5

Add resonators if desired.

This system has the advantage of holding the tubes gently but firmly. They won't fall out if the instrument is tilted sideways, nor will the tubes rotate while being played. This is important if you are trying to avoid the inherent beating in tubes with seams. This system allows for quick set-up/disassembly as well as the option to remove notes when playing in specific scales.

I usually strike the tubes on the seam when tuning. This brings out the lower of two pitches which are 10 to 15 cents apart. Striking the tube 90 degrees off the seam will bring out the higher pitch while any point in between will bring out both pitches giving that characteristic conduit beating. When I place the tube in the frame, I put the seam facing down which gives the same tone as hitting directly on the seam. I also mark the nodes on the seam with indelible marker, giving me a reference point when I assemble the instrument.

A few years ago I had the great fortune to work with a very fine musician and composer from Bali, I. Made Lasmawan. He worked with the Denver Gamelan, *Tunas Mekar*, of which I was a part. For one of his gamelan compositions he envisioned the construction of a new instrument made out of conduit. He and I worked out the design details and we built it together. It consists of the four-note scale from the Angklung Gamelan plus a fifth note which is often played by the suling, or bamboo flute. Each note has five conduit tubes, slightly mistuned from one another so that when each note group is "strummed" with a mallet, it creates the shimmering effect typical of Balinese music (see figure 6)

Each note-group spans about 20 cents and if you turn each tube so that the seam points ↖ or ↗ or ↘ or ↙ , each tube will produce two pitches, further adding to the overall shimmer.

The instrument was made with 3/4" conduit with the scaffolding

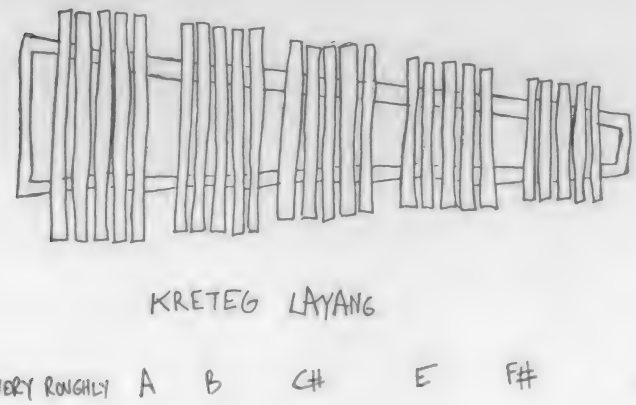


FIGURE 6

nail/shock cord suspension and a reflector/leg system previously described. The range was A4 to F#5. We used Glockenspiel mallets to play it, thin handles with small brass balls about 3/8" diameter at the ends.

Lasmawan named this instrument, and the composition it was made for, "Kreteg Layang", literally "Bridge Fly". One of the images associated with this name is about his experience coming to this country and seeing massive freeway interchanges soaring through the sky. Everybody seemed to be going so fast and disregarding each other. A deeper image that he felt about this name and especially the instrument was a bridge connecting Bali with the U.S.A., a culturally rich interchange to be sure. In his composition "Kreteg Layang", which is firmly rooted in traditional Balinese music, Lasmawan wanted to stimulate feelings or emotions not usually portrayed within the context of the gamelan repertoire. This piece can be heard on our recording titled "Gamelan Tunas Mekar." (Available from Mike Fitts, 3256 Revere St. Aurora, Colorado, 80011; phone (303) 363-7509. $10.00 postpaid.)

FORK CHIMES AND EVERLY CHIMES

By Bart Hopkin

My contribution to this collection of tubuloniac ideas will be to describe two techniques for drawing two or more tones from a single chime, for harmony or chordal effects.

EVERLY CHIMES

A metal tube which is not perfectly uniform and cylindrical is likely to produce a dual fundamental – that is, two pitches competing for the honor of being called the fundamental, and of being heard as the defining pitch of the struck tube. This phenomenon was discussed in last issue's "Tubulonia" article. It came up in connection with the seam found in some inexpensive tubings, which throws off the cylindrical symmetry and gives rise to the (usually unwanted) dual pitch effect. The two pitches come about because, as a result of any asymmetry, the tube's effective rigidity differs depending on the direction of vibration. If you strike the tube from an angle which causes it to vibrate in the more rigid direction you get a slightly higher pitch (see the Figure 1). This happens, for instance, if you strike a seamed tube on or directly opposite the seam. If you strike 90 degrees off axis, causing it to vibrate in the less-rigid direction, you get a slightly lower pitch. Typical random strikes are likely to be neither directly on the rigid axis or 90 degrees off axis, but somewhere in between, exciting both pitches simultaneously. In the following paragraphs I'll use the phrase "directional rigidity differential" to refer to this asymmetric tube phenomenon.

In most cases the asymmetry is fairly minor, yielding two pitches that are quite close. For instance, the pitch difference caused by the seam in inexpensive electrical metal conduit is typically in the range of 15 - 20 cents (that's a fifth of a semitone or less). Pitches that close

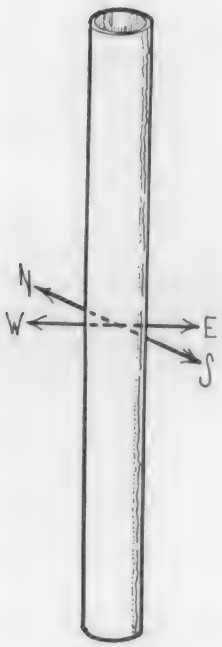


FIGURE 1: Directional rigidity differential: A small seam along the north-south axis makes this tube more rigid for vibrations in the north-south direction. As a result, the pitch is slightly higher when the tube is struck from an angle that excites vibration along that axis.

FIGURE 2: A small hole at the center of the tube weakens it slightly, lowering the pitch for vibrations in the direction from which the hole was drilled.

together aren't heard as separate pitches. Instead they give rise to the effect known as beating, in which the listener seems to hear a single compromise pitch, but with wavering loudness – a tremolo-like rise and fall in volume. The farther apart the two pitches are, the more rapid the wavering. A bit farther apart still and the sound becomes increasingly rough and dissonant; until at a certain point the ear becomes able to distinguish the two as separate pitches.

Some tubular instrument makers enjoy the beating effects from the slight asymmetry of inexpensive tubings. But most would rather avoid it. Most makers, regardless of persuasion, treat the degree of asymmetry in any tube as a given, being an incidental result of the manufacturing process. Yet it makes sense to ask, are there ways to control or alter the amount of directional rigidity differential in a given tube? If you could do so, perhaps you could eliminate unwanted beating, by evening out the rigidity all around. Or you could deliberately cultivate the beating effect and control the speed of the beating, by finely varying the directional rigidity differential. Or you could (as I will propose in a moment) create a single tube which produces two distinct fundamental tones in harmony with each other, by creating a very wide rigidity differential.

There are indeed ways to deliberately alter the differential. Some techniques are more sophisticated or refined than others, but here is the simplest I have thought of.* Drill a hole through the very center of the tube, as shown in Figure 2. The center of the tube is the point of greatest flex for the tube's fundamental mode of vibration. Drilling the hole weakens the tube, making it less rigid for vibration along the direction from which the hole was drilled. There is some weakening in the 90 degrees off-axis direction as well, but the off-axis weakening is far less – thus, the directional rigidity differential is created. The larger the hole, the greater the weakening on axis and the greater the differential. This allows you to fine tune the pitch difference by varying the hole size. Here are some practical observations on the process.

1) To eliminate unwanted beating (a rather subtle process), first support the tube in a manner that allows it to ring. Resting it across two foam pads, each located between a fourth and fifth of the distance in from each end will work well. Give the tube a series of taps at the center at point all around its circumference, and mark the tapping points that produce the higher pitch alone. There should be two such points, opposite one another. Start by drilling the smallest hole possible through those two points. Tap again; if the same points still yield a higher pitch, drill with the next size larger bit. Repeat until the pitch at the high points has dropped into agreement with the pitch you get tapping 90 degrees away. If you overshoot, making the pitch at the former high point too low, then drill with the smallest bit along the perpendicular axis – but try not to let this corrective process of drilling along one axis and then the other in search of agreement get out of hand.

2) To introduce a beating effect into a tube where none exists, drill a small hole through the center. Since the non-beating tube presumably was symmetrical all around to begin with, the direction of drilling doesn't matter.

3) To alter the speed of an existing beating, first, tap around the circumference at the center and locate the tapping points for the high pitch, as described above. To slow the beating speed, you need to reduce the directional rigidity differential, thus bringing the two pitches closer together. Do this by drilling through at the high-pitch points. Start with the smallest available bit; proceed to larger bits as needed. To increase the beating speed, drill 90 degrees off axis. The larger the hole, the greater the increase in beat rate.

The procedures just described, used for fine-tuning beats, involve small holes , typically not larger than 1/8". Holes of that size will have negligible effect on tone quality, and a very minor lowering effect on overall pitch. If necessary, the tube can be brought back up to its original pitch by shortening it, removing a bit of material from both ends.

4) To make a tube producing two fundamentals far enough apart to be heard as two separate pitches requires more drastic surgery. The hole must be rather large relative to tube diameter, and in cases where you need to have specific pre-determined pitches in the end result, more after-the-fact fine tuning is required. The largest interval that can be easily achieved is typically about a third or fourth. Larger intervals require so much weakening at the center that the integrity of the tube as a monolithic vibrating entity may be compromised, and tone quality suffers. That's why I call these things Everly chimes – they work best in thirds. The harmonized tubes can function in typical marimba-like tubulon configurations, although the musical parameters of two-notes-for-one are somewhat unconventional. But they also are especially nice in wind chimes.

To achieve an interval of a third, the center hole will have to be large enough to cause even the off-axis pitch to drop substantially. For this reason I suggest starting with a tube tuned above the higher of the intended ultimate pitches – a major second, perhaps? Begin by drilling a center hole whose diameter is half the tube diameter or a little less. The resulting interval between the two sounding pitches will probably be much smaller than the major or minor third we are aiming for. To further increase the interval, you will need to enlarge to hole, but it will be difficult to drill at diameters increasingly close to the actual tube diameter. So – go to a grinder. No need to keep the hole on each side circular in shape; all that matters

*Builders take note: It's true that the approach I describe here was "the simplest I [had] thought of" at the time I did this writing. But I did the writing before receiving the article from Daniel Schmidt that follows this one. In that article, after discussing some rather sophisticated techniques, Dan makes note of another approach to altering the directional rigidity differential that you might find simpler still. Be sure to read his article before heading for the workshop.

now is how much you remove of the remaining side wall material between the holes on front and back. Figure 3 shows a typical non-circular hole shape after grinding. Try to remove material symmetrically on both sides. Proceed cautiously and check the pitches often, as the pitch drops rapidly in this process.

When you have achieved the desired interval between the two tones, check the actual pitches. Unless you're unusually lucky, they will not match the intended final pitches. Hopefully they'll be just a bit low. Bring them up by shortening the tube at both ends. This re-tuning may throw off the interval again. Correct it either by grinding a bit more to widen the interval, or drilling a small hole 90 degrees off axis to narrow it.

If you are tuning to specific, precise pitches, this is a painstaking process. If you just like the sound of the dual-pitch chime and don't care about the exact pitches, it's much easier.

And it is a lovely sound. The effect is not the same as two differently-tuned chimes sounding simultaneously. Maybe it's just because I am aware that it is a single element sounding, but for me the Everly chime has that magical quality in which the implied separateness of harmony disappears into a faceted singleness of timbre.

All that has been said in the preceding articles about proper mounting for metal percussion tube instruments, whether marimba-style or suspended chime-style, applies as well to the Everly chimes. A final note applying to all of these directional rigidity differential instruments: the angle of strike, we have seen, determines the direction of vibration, which determines how strongly each of the two tones will sound relative to one another. By striking from certain directions, the player can bring out one tone almost exclusively. If you want to bring out both tones in order to get the effects described here, you should strike near the 45 degree points, between the two main axes of directional rigidity. That will normally be 45 degrees off axis from whatever holes you may have drilled. However you mount the tubes, do so in such way that encourages striking from that direction.

FIGURE 3: A tube with an enlarged hole, creating a relatively large interval (typically a third) between the tube's two pitches.

FORK CHIMES

Here is another way to get more than one tone from a single chime, based in a completely different set of acoustic principles. Fork chimes produce not two fundamentals, but a whole rainbow of tones, with the distinction between fundamentals and overtones pretty well obscured in the cumulative result. The player can bring out different tones by striking the fork chime in different locations. With the many tones present, the result is – well, *symphonic* would be a shameless exaggeration. But there are a lot of different sounds to be heard, and the effect is pretty.

In a fork chime, one or both ends of a metal tube are slit longitudinally, as shown in Figure 4. The opposing halves of the slit end are then free to operate in the tuning fork mode of vibration, flexing in complementary motion in toward one another and then out away from one another. I'm not sure, but I suspect that the slitting of the end allows a torsional (twisting) vibrational mode to set up at the ends as well, and perhaps a sort of lateral tuning fork mode. The normal free-bar modes (the usual tube-chime vibrational pattern) remain free to sound as well. All of these modes can happen simultaneously and independent of one another. Each produces its own string of fundamental and overtone pitches.

FIGURE 4: Fork chime.

You can sound the fork pitch preferentially by striking near the end at the center of the tongues. Striking near the side of one of the tongues should preferentially excite the torsional mode pitch. The deeper you make the slits, the lower will be the fork tones and the torsional tones. In making and tuning the slit, you can cut a bit, check for fork pitch by tapping, and cut a bit more as desired, until you arrive at something you like. As with other chimes, you can bring out the free-bar pitch (that is, the regular chime tone) by striking near the center of the tube length. Cutting the slits for the forked ends will raise the free-bar pitch but only slightly. You can raise the chime pitch more deliberately by shortening the overall tube length, but in doing so you will also be shortening the forks and raising their pitches.

With all these facets in interaction, you will find it almost impossible to tune a fork chime in a prescriptive fashion – that is, aiming to produce a specific set of pre-planned pitches. Think of it instead as an exploratory process. Try altering one parameter or another, listening to the results at each step, until you stumble upon an appealing set of pitch relationships within the chime. You can make a fork chime quickly and easily and inexpensively, so make many. Each will have its own personality, and you will like some more than others. Make a *whole lot* of fork chimes; then find groups of three or five or eight that strike your ear as having compatible personalities, and learn to play them as a set. Or just place them, suspended individually or in groups in different locations around the house or outdoors, to play occasionally as you pass by.

The fork tones within a fork chime will sound even when the middle part of the tube is rigidly mounted or held in one hand, but that, of course, will kill the regular chime tones. To allow for fork and chime modes both, fork chimes can be suspended like wind-chimes or mounted marimba-style. Once again all the comments on mounting appearing throughout this set of articles apply as well to fork chimes, with this added note: Avoid attaching mountings (whatever they may be) within the forked regions. The standard mounting points, we've seen, are at the nodes for the free-bar fundamental mode, normally located at two points, 22 ½% of the overall length from each end. If these happen to fall well within the forked region, consider cheating a bit and moving the mounting points a little more toward the center.

TUBE INSTRUMENTS

by Daniel Schmidt

I would like to first discuss the main body of my work with tubing, using 6061 alloy aluminum, 1⅝" outside diameter by 1⅜" inside diameter. Following that I will touch upon some points about using EMT (electrical conduit). I will close with a discussion of timbre in tubes.

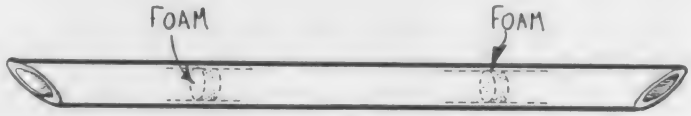
I'd like to say that I carefully chose this particular aluminum tubing, but actually happened across it by chance. It was free, so I started cutting. I tuned with a Strobocon (a stroboscopic tuning device widely used at the time) in the early 70s, and soon I had my first stumbling block clearly uncovered. There were two pitches in most pieces, so close together that they beat against each other. My first approach to this was to cut adjacent pieces from adjacent stock. This yielded a similar character to all pitches cut from one stick. What to do when changing to another stick? Especially in the middle of an instrument? The sound of the new material often was quite different. I established the basis for this difference. It is variations in wall thickness. Looking at the cross-section, one sees two mis-aligned circles. In manufacture, the inner wall is not aligned with the outer. The axis through the thicker material produces a higher pitch, creating a beat against the lower pitch of the thinner walled axis. In my first instruments I incorporated the beat into the character of the instrument, but my perfectionism eventually won out. I wanted to control the rate of the beat, so I designed a simple lathe to hold the tube by its inner surface, so I could grind off the outer surface to even the wall thickness. This boiled down to using a disc grinder in successive passes with the tube not rotating. This reduced the thicker part of the wall. Then I made light passes with the grinder with the tube spinning to smooth it out. This was quite successful, and I only removed the material between the nodes. The ends beyond the nodes are not part of the "spring" action of the tube's vibrational movement, and act only as counterweights, so one need not be concerned with their out-of-roundness. To explain this briefly: bars (and tubes), when vibrating, reverse direction when the resistance to further flexing in the center of the bar overcomes the movement of the bar in one direction. The outer ends move in the opposite direction. The mode of movement is much like a double see-saw, with the fulcrums at the nodal points. Actually, a bar makes a better sound when it doesn't have those outer ends flapping up and down in reverse phase to the center. They can be replaced by weights. The Sound Column, an acoustics exhibit that I built for the Exploratorium in San Francisco, is a good example of this application. When I built it , I had to dispense with the ends of the bars, and developed a simple weight system.

But, concerning tubes, the center section is where the two pitches are created. In his accompanying article, Bart calls this the directional rigidity differential. To control the resultant beating, that is where to work. I think of the center as the energy-storing portion of a tube or bar. I found I could completely control the rate of beat of this thick-walled aluminum tubing. My earlier problems of matching the sound of adjacent tubes disappeared, and the inherent timbre of the tubes was more apparent. An added advantage of grinding the center of a tube is that the pitch will drop, so one can lower the pitch just as one does with a bar. This is a useful control when tuning.

But what instruments did I produce with these carefully prepared tubes? My later instruments were designed for use in my gamelan, so they have a horizontal layout. They span three octaves, all using the same diameter of tubing. The mounting is with strings passed through 1/8" or less holes in the tubes. The string is supported by narrow posts between the tubes. My earlier tube instruments were hung like chimes. The point of suspension was usually at the nodes. Sometimes I suspended at both nodes, to control swing, and sometimes I only used the upper node as a suspension point. Swing is then bound to occur. One might try mounting in a curve instead of a flat plane, so the swinging tubes can collide. The form that each of us uses for our instruments is up to us. For example, since I love the sound of the aluminum, I use every bit of it. After building my concert instruments, I made gifts of the scraps, designing mountings suitable to the usage of the recipients. These might be hanging circles or random groupings to be stroked into motion by the hand, or clusters hung in a tree to be activated by the tree's movements.

I will now discuss a few diverse topics related to tubing, which will add to the recent wealth of information which has appeared in *EMI*. Regarding control of beats in EMT, I offer the following suggestion. The difference in pitch is due to differences of rigidity, i.e. one axis is stiffer, producing a higher pitch than the other. If one decreases the diameter along the higher pitched axis, the pitch of that axis will drop, and the pitch of the other axis will rise. This alteration only needs to be performed between the nodes. I first did this by careful hammering to reduce the diameter. Charles Sawyer, one of the founding members of the Berkeley Gamelan and an instrument builder in his own right, suggested squeezing it in a large vice.

On the subject of self-resonating tubes, Charles Sawyer had developed a very successful design for EMT. He forms a quarter-wave resonator inside both ends of the tube using plugs of ethafoam. (A tube enclosing an air column stopped at one end and open at the other forms a quarter-wave resonator in that it encloses 1/4 of its resonant frequency wavelength.) He cuts the ends of the tube at an angle, so that the outer tips drive the resonators.



The tubes are mounted at their nodes, preferably without drilling holes, as that would affect the resonating properties inside. I suggest Steven Smith's bungee cord suspension, described in this issue. The idea of the angle cut is to form a "paddle" of the end, which will drive the column of air inside the tube. This design is patented by Charles, but he has given permission for this publication.

This is worth experimenting with. Various angles should be tried. Ethafoam is readily available from packaging boxes made for heavy appliances. It looks like styrofoam, but is a closed cell, flexible foam. It is quite firm. Tuning is tricky. I suggest cutting each tubing piece long, then grinding or filing it up to pitch, taking into account the effect of the ethafoam plugs. A good electronic tuner is a great help. Korg makes an excellent one for keyboard tuning. Although chromatic, it can measure any pitch.

On the subject of timbre, I suggest that we keep our minds (and ears) open. Each type of tubing offers its own unique wealth of overtones. Let us not disregard these as undesirable. Using the techniques which I've described above, the beat can

be controlled. Once that parameter is controllable, overtones become more similar in all the tubes (pitches) of one's instruments. One can then come to envision possibilities for use of the overtones, either as timbre above the fundamental or as pitches themselves (yes, they can be isolated from the fundamental and other overtones).

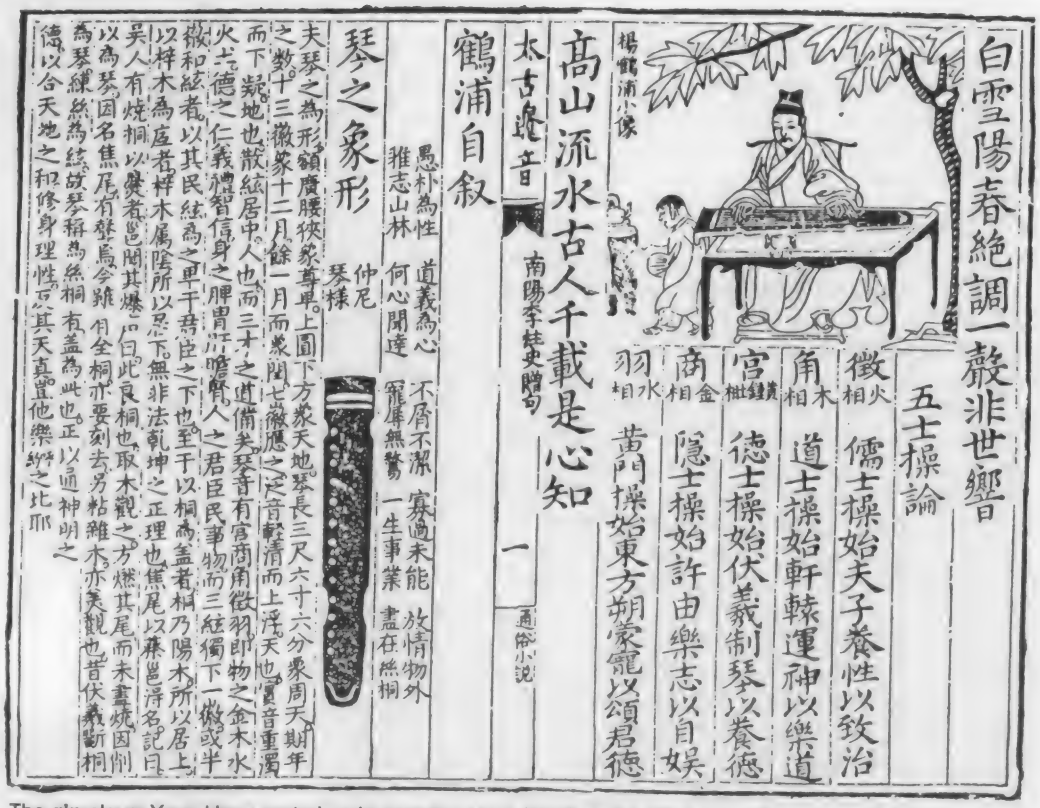
One could react to this saying that those are clangorous, dissonant sounds which are useless and undesirable. I offer an example from my own experience. In my early tube instruments, made of thick-walled tubing, I observed a strong overtone approximately an 11th above the fundamental (that's a 4/3 plus a 2/1, or an octave and a fourth). This interval varies. It corresponds to the length/diameter ratio. In my favorite aluminum, the 4/3 is perfect at about 30 inches. The 4/3 interval, as well as all other overtones, becomes compressed narrower as the tube is shortened, and wider at greater lengths. Using this phenomenon, I designed a tuning for a commissioned set of chimes in 1972. I used the fourth as the basis for a circle (like the circle of fifths). However, as I ascended through the circle, each successive 4/3 was compressed. The amount of compression was derived from the overtone compression which occurred as the tubes got shorter. This can be charted as a logarithm. I did it in this way. I started with a length which produced a perfect 4/3. This occurs an 11th above the fundamental, so I moved it down an octave. Then I had two tubes a 4/3 apart, the upper one's fundamental tuned an octave below the first overtone of the lower one. They sounded very sweet when I matched their beat rates! The third pitch was derived in the same manner from the second pitch. However, the 4/3 is compressed in the second tube, making the third fundamental lower by a bit. This compression varies with material characteristics so I am not giving the amount of intervallic compression here. I derived the fourth pitch similarly, from the first overtone of the third pitch, but I placed it in a range just above the fundamental. The fifth pitch was placed just above the second. The result was a "scale" derived from stacked fourths. I suggest one try this procedure on a piano. Though it will be in equal temperament, one can thereby understand the result easily. In my chimes, the ever-increasing compression nullified the overtone. That is, as the tubes became shorter, the first overtone became less discernible from the other. It becomes less predominant in amplitude, as well as "impure" in its intervallic relationship. I stopped making new pitches when my tubes became too short to derive new pitches from. Please understand, I first made a set of tubes, each a 4/3 higher than the previous, and tuned to its first overtone (which occurred at a 4/3 plus a 2/1 or an 11th). Than I made tubes an octave lower than these to "fill in the gaps", producing intervals close enough to be considered stepwise.

The resultant instrument draws its pitch relationships from the inherent character of its material. I offer this as an example of many ways to incorporate overtone characteristics into one's instrument designs.

In ending, I wish to point out that timbre is controllable in tubes. Other *EMI* articles have discussed resonators and other methods of increasing amplitude. Resonators do increase amplitude, but they must be seen as filters also. They increase certain portions of the overtone spectrum. That is, they alter the amplitude relationships of a given vibrating member, be it tube, bar or whatever. Mallets control timbre, as does our technique of striking with them. Also the suspension of the tubes affects their timbre. Tubes offer a rich palette of timbral possibilities. Let us all explore the possibilities with open minds.

THE WIND ENTERS THE STRINGS: Poetry and Poetics of Aeolian *Qin*

By Mitchell Clark



The **qin**-player Yang Hepu seated under a **wutong** tree (right), and a **qin** as seen from above (left, strings not shown), from the opening pages of **Yang Lun Taigu yiyin** (1589). After **Qinqu jicheng** 7 (Beijing, 1981), 49.

The production of sounds by means of the wind in stringed instruments – whether on an instrument designed for that purpose or on one designed to be played by a human player – is something that has captured the imagination as long, it would seem, as there have been stringed instruments. Aeolian *inspiration*[1] is found in versions of the origin myths of the Greek lyre and the West Asian lute. As well, accounts of being sounded by the wind add to the extra-musical resonance of the biblical *kinnor* (King David's "harp"), medieval English harp, and North Indian *mahati vina*.[2] The actual design and construction of stringed instruments for the purpose of being sounded by the wind and not by a human player may possibly have originated in China. Literary evidence points to the existence of *fengzheng*, a "wind zither" utilizing a kite upon which a musical bow is mounted, by at least the later first millennium AD.[3] But it is in the literary descriptions of the aeolian sounding of the *qin*[4] zither where we find in Chinese poetics accounts that reflect the important role that wind plays in sounding musical strings (and in this case, in an instrument not designed for that purpose). This theme of the aeolian *qin* is one which can be found in Chinese poetry for perhaps a millennium (if not longer), and should be considered with the whole of information regarding the aeolian sounding of stringed musical instruments.

The *qin* is a seven-string long zither, without bridges, of the Han Chinese. Organologically, the *qin* is quite simple: the silk strings are stretched over a long, narrow, lacquered body, about 1.2 meters in length, made of two wooden boards. The upper board, curved in cross section, is traditionally made of *wutong (Firniana simplex;* the English common name is "Chinese parasol tree"), and the lower, flat board of *zi (Catalpa kaempferi;* catalpa). With the strings under low tension and with only about two centimeters of resonant space between the two boards, the *qin* is a very quiet instrument. Traditionally it has been considered an instrument for intimate music making, almost always played alone. The *qin*'s origin may be placed as early as the 29th century BC; a traditional origin myth of the instrument claims it as the invention of Fuxi, China's first "culture hero" and inventor of some early musical instruments. Because of its venerable age, the *qin* is also commonly now called *guqin,* "antique *qin.*"

POETRY OF THE AEOLIAN *QIN*

The accounts of the aeolian sounding of the *qin* are found primarily in the form of poetry – that is, the primary evidence is literary evidence of a creative kind. Traditionally in China there were five arts practiced by the literati, namely *qin-qi-shi-shu-hua.* These are the *qin*, the chess-like game called *qi* (related to Japanese *go),* poetry, calligraphy, and painting.[5] A literatus was expected to be versed in each of these arts, although only occasionally did someone really excel at more than one or two of them. There are many cases throughout the history of Chinese poetry where the poet, speaking through a poem, is a player of the *qin.* Poetry in which the *qin* appears described in an actual sounding context has very much the quality of being a kind of verbal musical notation, one which describes a certain mood and situation for playing the instrument, which may be conveyed from one poet/*qin*-player to another. In this context of "verbal notation," the textual materials addressed below are the central documents concerning the sounding reality of wind-articulated *qin.* Wind is a major natural image in Chinese poetry,[6] and as the playing of the *qin* is an important image relating to human activity in the poetry, it is not surprising that the two themes

occasionally intertwine.

In early times, particularly during the Han dynasty (206 BC-AD 220), correlative systems were an important part of Chinese musical thinking. In traditional Chinese cosmology there is a system of correspondences in which five basic elements *(wuxing)* – earth, metal, wood, fire, water – are correlated to the five pitches of the pentatonic scale, five seasons (the four usual ones plus a variously reckoned "fifth" season), five colors, and so on.[7] Regarding associations of the *qin* and wind, important connections with the *wuxing* are those to the element of metal, to *shang* (the second note of the Chinese pentatonic scale) and its corresponding mode, and to the season of autumn. The close connection of the *qin* with, specifically, the autumn wind is one to be found throughout the history of the instrument. In *qin* music the pervasive mood/mode (when one can be said to be at the fore) is the autumn/*shang* correlation, and in many *qinpu* (collections of *qin* notations), pieces in *shang* are the most numerous.

Indicative of its traditionally close connections with poetry, *qin* music also prominently features wind images, on a literary level. The *qin* and wind correlation thematically finds its emphasis in titles and texts for *qin* pieces – for example, *Wuye wu qiufeng* (*"Wu*[*tong*] leaves fluttering about in the autumn wind"), *Jinfeng luo ye* ("A metal [i.e., autumn] wind scatters leaves"), and so on, as well as *Feng ru song* ("The wind enters the pines," mentioned below). In these we find that the sounding of wind in trees – especially in *wutong* leaves or pine-needles – is a common imagery relating, textually, to the *qin*. On the level of the music itself, despite the fact that programmaticism is common in *qin* music, the programmatic representation of the sound of wind does not appear to be found in any *qin* piece. It would seem that wind imagery relating to the *qin* found its expression in poetry – and, especially, in the poetic description of the aeolian sounding of the *qin* – rather than in *qin* music itself.

The circumstances necessary for a *qin* to be sounded by the wind are increased by the fact that it has been traditionally considered very favorable to play the *qin* outdoors (seated on a rock, for instance), or in an open pavilion, or simply by an open window.[8] The sounds created by the aeolian sounding of a *qin* are extremely faint, as may well be imagined since the *qin* is such a quiet instrument to begin with. In earlier times, such as those from which the poetry of the aeolian *qin* originates, the world was a quieter place, with far less ambient noise. What to many listeners today may seem like a barely audible instrument was earlier considered to be an instrument of great expressive range, made all the more so by the fact that it might hum on its own in the wind.

XI KANG

The poetics of the aeolian sounding of the *qin* appear to begin with Xi Kang (223-262), a poet and an important early aesthetician on music, as well as a *qin* player who has had a central place in *qin* lore. In a couplet from one of Xi Kang's poems is perhaps the earliest reference to the subject of wind-activated *qin* strings:

> *Xixi* sounds a breeze from the valley
> As it blows on my simple *qin*.[9]

In this poem, the aeolian sounds are described by means of a reduplicative (*diezi*), the doubling of an existing ideograph to create a new word with, in this case, an onomatopoeic function. *Xixi* is one of many reduplicatives onomatopoeically descriptive of the sounds of the wind.

Xi Kang's presence is also found in a *qin* piece which embodies the associations of *qin*, autumn, the *shang* mode, and wind and its sounding in pine trees: *Feng ru song* ("The wind enters the pines"). The implication in this title is that the wind, upon entering a pine grove, rustles the needles and branches, and causes them to sound. Xi Kang is credited with having written the original poem of the title *Feng ru song*, a song to be sung presumably to *qin* accompaniment.[10] The modern *qin* piece called *Feng ru song* (included in a number of *qinpu* since the early Ming dynasty, 1368-1644) is not a piece found in the performing repertoire of contemporary *qin* players; as it is most commonly known it is a short, simple *qin* song suitable for beginners. But expanded versions of *Feng ru song* may be found in some *qinpu*. In one *qinpu* from the late Ming dynasty,[11] *Feng ru song* has become a long, multi-sectional composition made entirely of new material – except for one section, in harmonics, in which the classic *Feng ru song* melody appears in high harmonics, as if heard faintly, wafted in on a breeze, only to disappear when the music returns to the new material.

A pine tree near May Lake, Yosemite, which was particularly responsive, sonically, in the blustery winds of September 1993. (Photo by the author)

FOUR POEMS

As mentioned earlier, the primary documents of the aeolian sounding of the *qin* are poems which include this imagery. Following are four such poems, presented in a tentative chronological order. The original texts of three of these poems are found in the Ming-dynasty compilation of texts, notations, and general information relating to the *qin*, the *Qinshu daquan* ("Collected *qin* books"), edited by Jiang Keqian and published in 1590. Two chapters of this enormous work are devoted to poetry on the subject of the *qin*.

Yong chunfeng ("Spring wind"), by He Xun (died *circa* 527)

> It can be heard but not seen,
> It may be a gale and then a zephyr,
> Breathing pollen onto the mirror's face
> And whispering through the *qin*'s strings.[12]

Like the subtle sounds of aeolian strings themselves, the poetic imagery of the aeolian-sounded *qin* can be elusive: J.D. Frodsham and Ch'eng Hsi, in *An Anthology of Chinese Verse*, interpret the *qin* sounds of the last line of this poem as being the dying resonances of a *qin* which has just finished being played.[13] Despite the prevalence of autumn wind in *qin* aesthetics, this poem of an aeolian *qin* specifically addresses the spring wind.

寶琴　釋彪

吾有一寶琴價重雙南金刻作龍鳳像彈為山水音星
徙徽裡發風來絃上吟鍾期不可遇誰辨曲中心

The text of Shi Biao's **Baoqin**, from **Qinshu daquan** (1590), 19.4b.

After **Qinqu jicheng** 5 (Beijing, 1980), 417.

琴　宋名賢

琴聲元是梧桐樹彈到秋風更可憐昨夜窓前聞落葉一
如商調第三絃

The text of Song Minxian's **Qin**, from **Qinshu daquan** (1590), 19.9a.

After **Qinqu jicheng** 5 (Beijing, 1980), 420.

Baoqin ("A precious *qin*"), by Shi Biao

I have a precious *qin*,
Worth twice its weight in southern gold.
Engraved with images of dragon and phoenix,
To play it is to create the sounds of mountains and rivers.
The *hui* sparkle like stars,
And when the wind arrives, the strings begin to hum.
All this: but I have not met Zhong Ziqi.
Who then will recognize the heart of this music?[14]

In this poem, the qualities of an especially fine qin are enumerated and the instrument's sensitivity to the wind is considered a prized feature. The *hui* are thirteen disk-shaped markers, usually of mother-of-pearl but occasionally of precious metals, placed along the length of the *qin* to indicate the harmonic divisions of the strings. Zhong Ziqi (the text of the poem gives Zhong Qi, another version of his name), who is said to have lived during the Spring and Autumn era (771-476 BC) of China's Zhou period (circa 1100-221 BC), was famous for his abilities to recognize the intent behind the *qin* playing of his close friend, Yu Boya. Traditionally, *qin*-players may often speak of their desire to meet a listener with Zhong Ziqi's musical understanding. The mention, earlier in the poem, of creating "the sounds of mountains and rivers" may also be in reference to Yu Boya: as the story goes, he was able through his playing to create for Zhong Ziqi vivid images of tall mountains and flowing rivers.

Qin, by Song Mingxian

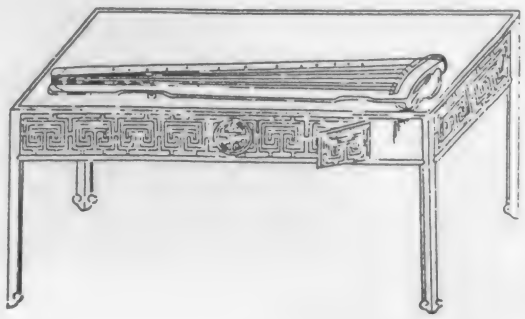
The sound of the *qin* has its origin in the *wutong* tree,
And is a lament greater than the autumn wind.
Last night by a window, I heard a leaf fall:
A sound like that of the third string in the mode of *shang*.[15]

Wutong is treated with reverence in *qin*-related matters, and as the principal wood of which a *qin* is made it occasionally enters into poetry about the instrument. In this poem, the aeolian *qin* is not present, but the whole complex of *wutong*, autumn wind, the sound of leaves, and the *shang* mode are – the *qin* being the unifying agent.

Yong qin, by Bai Juyi (772-846)

A *qin* is placed on its small table,
At which I sit — idly, yet mindfully.
Why take the trouble to actually play?
A breeze comes, and the strings sound by themselves.[16]

In the poems thus far quoted, the aeolian sounding of the *qin* is only part of the story. In this, by the Tang-dynasty poet Bai Juyi, aeolian tones and the philosophical disposition towards them are the central theme. This poem may be considered as the cornerstone of the literature of the aeolian *qin*.



A **qin** on its table (**qinzhuo**), from **Wuzhizhai qinpu** (early 1720s), section 1.

After **Qinqu jicheng** 14 (Beijing, 1989), 409..

"...A BREEZE BLOWING THROUGH THE PINES..."

The latest use of the theme of the aeolian sounding of the *qin* I've found is from the Northern Song dynasty (960-1126). In a *qinming*, a literary inscription (not a poem *per se*) for a *qin*, entitled *Gui he* ("Returning crane"), the poet Su Dongpo (1037-1101) concludes with "...on an embankment, a breeze blowing through the pines vibrates the [*qin*'s] vermilion strings."[17] Further investigations of the vast body of Chinese poetry (which itself covers a period of almost three thousand years) may well reveal many more poems on the aeolian *qin*, and expand the historical period (third through eleventh centuries AD) I've been able to present in this introduction to the subject. The poetic theme of the aeolian *qin* is one which not only enriches the aesthetics of the *qin*, but contributes to the history of the aeolian soundings of musical instruments as well as to our appreciation of the soundings of the wind in all of its manifestations.

NOTES

1. "Inspiration" derives from the Latin **inspirare**, "to breathe in or into" (Eric Partridge, **Origins: A Short Etymological Dictionary of Modern English**; New York: Macmillan, 2nd. ed., 1959), 652; "aeolian" is from Aeolus, the Latin version of the name of Aiolos, the Greek mythological god of the winds.

2. Stephen Bonner, **Aeolian Harp**, Vol. 2, Pt. 1: The **History and Organology of the Aeolian Harp** (Duxford, Cambridge, England: Bois de Boulogne, 1970), 15-6. Bonner's quote uses the spelling of **mohati** for the **vina**. When compiling his work on the Aeolian harp, Bonner does not seem to have been aware of poetry describing the aeolian sounding of the **qin**, although a few of the poems – such as those by He Xun and Bai Juyi (included here) – are commonly translated into English.

3. Cf. the late-Tang-dynasty (618-906) poem entitled **Fengzheng** by Gao Pian (died 887), included in the section on humming kites (**fengqin**, "wind **qin**") in Wang Qinian, Wu Guanghui, and Yu Jiming, editors, **Fengzheng** ("Kites;" Beijing: People's Athletic Publishing Company, 1986), 72-3. "**Fengzheng**" is also the term for kites in general.

4. The **pinyin** system of the romanization of Mandarin Chinese is used for the body of this essay. **Qin** is spelled **ch'in** in the (older) Wade-Giles system, and the pronunciation of the word may be approximated by English "chin."

5. Sometimes four arts – **qin-qi-shu-hua** – are spoken of, poetry being omitted. I base the five on information from my **qin** teacher, Wu Wenguang, in 1986.

6. Burton Watson, in reference to the **Tangshi sanbaishou** ("Three hundred poems of the Tang"), the standard collection of major poems of the Tang dynasty, points out that "wind is the most frequent weather image" and that weather images themselves "form the largest single category of images." Burton Watson, **Chinese Lyricism: Shih Poetry from the Second to the Twelfth Century** (New York: Columbia University Press, 1971), 134.

7. A similar system is based on the number eight, which connects the eight trigrams of the **Yi jing** (the

"Classic of changes") with eight musical materials, eight family relationships, eight natural attributes, etc.

8. See the traditional prescriptions for conditions favorable for playing the **qin** in R.H. van Gulik, **The Lore of the Chinese Lute** (Tokyo: Sophia University/Tokyo & Rutland: Charles E. Tuttle, 2nd ed., 1969), 61; note especially prescription number 14, pointing out the advantage of playing the **qin**, "In a cool breeze and when there is a bright moon." For his book, "lute" is the translation of **"qin"** preferred by van Gulik.

9. Xi Kang, the 5th and 6th lines from the 12th poem from **Zeng xiong xiucai rujun shiba shou** ("18 Poems presented to my brother the **Xiucai** upon his entry into the army"), in Xiao Tong (6th century AD), **Wen xuan** (reprint, Beijing: China Bookstore, 1977), chapter 24 (p.342).

10. Guo Maoqian (12th century), ed., **Yuefu shiji** ("Collection of **yuefu** poems"; Beijing: China Bookstore, 1979), volume 3, 876. **Feng ru song**, as a title credited to Xi Kang, is included in the **Qinqugeci** ("Lyrics to **qin** songs") chapters (nos.57-60) of this collection.

11. **Guyin zhengzong** ("The correct teachings of the ancient sounds," 1634); reproduced in Music Research Institute of the Literature and Arts Research Academy, Ministry of Culture, and the Beijing **Qin** Research Society, compilers, **Qinqu jicheng** ("Collected **qin** pieces"), volume 9 (Beijing: China Bookstore, 1982), 298-9.

12. He Xun, **Yong chunfeng** in **He Xun ji** ("He Xun collection"; Beijing: China Bookstore, 1980), 46. **Yong chunfeng** literally means "speaking of the spring wind."

13. J.D. Frodsham, with Ch'eng Hsi, **An Anthology of Chinese Verse: Han, Wei, Chin, and the Northern and Southern Dynasties** (Oxford: Oxford University Press, 1967), 185.

14. Shi Biao, **Baoqin** in Jiang Keqian, ed., **Qinshu daquan,** 19.4b; in **Qinqu jicheng,** volume 5 (Beijing: China Bookstore, 1980), 417. I have not been able to identify Shi Biao past the appearance of the name in **Qinshu daquan**. This poem would appear to date from before the Tang dynasty, as ornate decoration of **qin** seems to have no longer been in fashion by that time; see van Gulik, The **Lore of the Chinese Lute,** 204.

15. Song Mingxian, **Qin,** in **Qinshu daquan,** 19.9a; in **Qinqu jicheng,** volume 5, 420. I have not been able to identify this name past its appearance in **Qinshu daquan.**

16. Bai Juyi, **Yong qin** in **Qinshu daquan,** 19.2a; in **Qinqu jicheng,** volume 5, 416. **Yong qin** literally means "speaking of the **qin**." An early example among the published English versions of this poem is quite interesting:

> Sometimes I hang my lute between the branches, and I sit down, leaving to the breeze the duty of making its chords vibrate. It then diffuses a soft music which costs me no effort whatever.

From Po-Kiu-Yi (Bai Juyi), "Working," in Gertrude Laughlin Joerissen, trans. (from the French of Franz Toussaint), **The Lost Flute, and Other Chinese Lyrics** (New York: Brentano's, 1924), 18.

17. Su Dongpo, **Gui he,** 10.24a-.24b, from **Shier qinming** ("Twelve **qin** inscriptions"), in chapter 10 of the **Dongpo xuji** ("[Su] Dongpo further collection") section of **Dongpo qiji** ("[Su] Dongpo seven collections"; n.p., 1909).

RECORDINGS

A PRIMER DISCOGRAPHY OF AEOLIAN INSTRUMENTS

By Mitchell Clark

A few beginning contributions to a discography of music of Aeolian harps and related species of wind-sounded instruments worldwide. (And there must be more out there that may be added to this discography. *EMI* welcomes further listings.)

ROGER WINFIELD: **WINDSONGS: THE SOUND OF AEOLIAN HARPS**

Saydisc CD-SDL 394 (CD, 1991) (Also reviewed in elsewhere in this issue of EMI)

A collection of music for Roger Winfield's homemade Aeolian harps. Each of the eight tracks may combine up to several instruments at once and is edited in the studio from several hours of material. As the back cover states, "Performed by Winds of the North, South, East and West under the musical direction of Roger Winfield." There is one portion – the beginning three minutes of *South Wind* – which features a "solo" (not over-dubbed) Aeolian harp. This is in many ways the most satisfying passage of the album.

VARIOUS ARTISTS: **AUSTRAL VOICES**

New Albion NA028 (CD & Cassette, 1990) (Reviewed in EMI 9/3 [March 1994])

The opening track of this collection of new music from Australia, Alan Lamb's *Journey on the Winds of Time I,* was "composed in 1987-88 from the sounds made by three miles of abandoned telegraph wires in the Great Southern Hinterland of Western Australia." Lamb "played" this wind harp by manipulating the wires while they were being sounded by the wind. His recorded material was edited in the studio "into compositions neither of my own making nor simply of the natural forces with which I interact" – not unlike Roger Winfield's work.

EXPLORATONE

Double-sided soundsheet included in **Exploratorium Quarterly** 10/3 (Winter 1986)

Includes a brief recording (side 2, beginning of track 6) of the Aeolian harp, built by Doug Hollis, on San Francisco's Exploratorium building.

JAN GARBANEK (WITH RALPH TOWNER): **DIS**

ECM ECM-1-1093 (LP, 1977; CD re-issue: ECM 1093 78118-21093-2)

Three of this album's six pieces include a "windharp" constructed by the Norwegian builder Sverre Larssen and recorded on the southern coast of Norway. These recordings are used for an atmospheric drone, over which Garbanek and Towner weave their improvisations.

ILES SALOMON: MUSIQUE DE GUADALCANAL
(SOLOMON ISLANDS: MUSIC OF GUADALCANAL)

Ocora C 580049 (CD, 1994; a reissue, with added material, of an earlier Ocora LP)

Includes a recording of a *ghau kilori,* an "aeolian organ" from the Ghaobata region of northern Guadalcanal. The *ghau kilori* recorded consists of four bamboo poles, about 15 to 18 feet long, placed upright in the sand at the inner edge of a beach. Each pole has cut into it apertures in the form of slits or holes of different sizes, and the wind whistles through these holes. In the short selection (track 10), the sound of the *ghau kilori* may be heard together with the breaking of waves on the shore. Two photos of the *ghau kilori* are included in the booklet.

Although there must be any number of "environments" recordings which include wind sounds, we'll just mention one of interest here: Gordon Hempton's *North America: Winds Across a Continent* (Nature Recordings NRCDH03 [CD, 1992]). This is a collection of recordings of winds in different locales in North America, and these breezes are heard sounding, in many cases, in various kinds of vegetation – such as aspen, oak, palmetto, and various reeds and grasses.

THE FLAME COMPONIUM

AND REFLECTIONS ON THE PYROPHONE

by A.R. Grazia

Dusty second-hand bookstores are a favorite haunt of mine. The glint of gold in the shadows of a poorly-lit music section caught my eye several years ago in one such shop. Depicted on the book's tattered spine was a mysterious flute of some type, embraced in a swirl of elegant foliage. Above the shimmering artwork were the guilded words "SOUND AND MUSIC, ZAHM". The threadbare blue-black fabric beneath the gold imprinting, the precise hand-inked card catalog number, long forgotten, now disintegrating with age, the chimerical touch of the author's name, and the sheer weight of the volume's 450 pages in a thickness usually occupied by half that number all struck me as I carefully freed the beckoning text from the crush of its comrades. I handle this tome very gingerly since its delicate pages are now over a century old.

Published in 1892 by A.C. McClurg and Company, Sound and Music was written by the Reverend J.A. Zahm, C.S.C., Professor of Physics at the University of Notre Dame. The work is graced by a collection of several hundred superb engravings portraying an astounding variety of technical sonic apparatus, a few of which might now be of interest...

ORG

THE FLAME COMPONIUM and Reflections on the Pyrophone

by Q. R. Ghazala

(continued from previous page)

These artworks are credited to an assortment of individuals including a student of Zahm named Frederic E. Neef, Dr. Rudolph Koenig and M.G. Masson, of Paris, as well as unidentified French and German artists whose illustrations were circulating in other music treatises at the time. Unfortunately, the beautiful engravings presently submitted bear no artist's signature.

In response, then, to EMI's recent coverage of fire music and the exquisite pyrophones described, and after delving back into previous EMI articles and assorted correspondence on the subject so as to not duplicate artwork or too many ideas formerly presented, here for the curiosity and perhaps inspiration of the interested are some enduring artworks, pyrosonic principles, and further plans leading up to a closing description of an imaginary experimental automatic instrument, the Flame Componium.

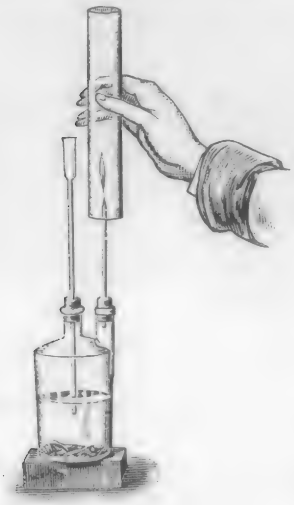


FIG. 11.

Figure 11 – Chemical Harmonicon. This wonderfully simple device was used to demonstrate a "singing flame." The materials for generating hydrogen gas are combined within a Woulfe bottle. The central stopper is pierced by a safety tube while the smaller stopper holds upright another glass tube, this one with a drawn tip through which the gas escapes thereby serving the function of a burner nozzle. As in the illustration, a glass tube is lowered into the correct position over the flame, suddenly creating " a note of singular purity and power."

Figure 110 – Kastner's Pyrophone. Zahm plainly states that the fantastic instrument depicted is Kastner's completed pyrophone (while crediting Wheatstone for creating the first playable musical pyrophone). Yet, though it is similar, it still is clearly not in agreement with the Kastner pyrophone photograph appearing in Kenneth Peacock's color organ article in EMI Volume VII, #2, September 1991. Could this be an artist's representation of a general written description of the instrument, rendered sight unseen? Or, more likely, a meticulous artwork based upon preliminary plans and sketches of the proposed fire organ? Would the artist have included the obscure machinery seen at the lower back of the instrument if such did not exist before him? But then, what of the gas burners that according to Zahm's description should have been visible within the glass tubes, about one-third of the way up from the bottom? Are there too many pipes for the number of keys? Could the foot pedals shift octaves or elicit partials by adjusting flame heights or positions? And what of the elfin door beneath the keyboard? None of these questions are answered in the only paragraph devoted to the instrument, even though the subject of singing flames is treated quite thoroughly amidst a number of pages. Zahm does go on to describe the paired-flame system whereby each glass tube contains two burners which, through a simple sliding collar mechanism, can be brought together to silence the tube (the position at rest) or separated (by pressing a key on the keyboard) causing the musical note to spring-forth. This device is depicted within Francois Baschet's letter in *EMI* Volume VI, #5.

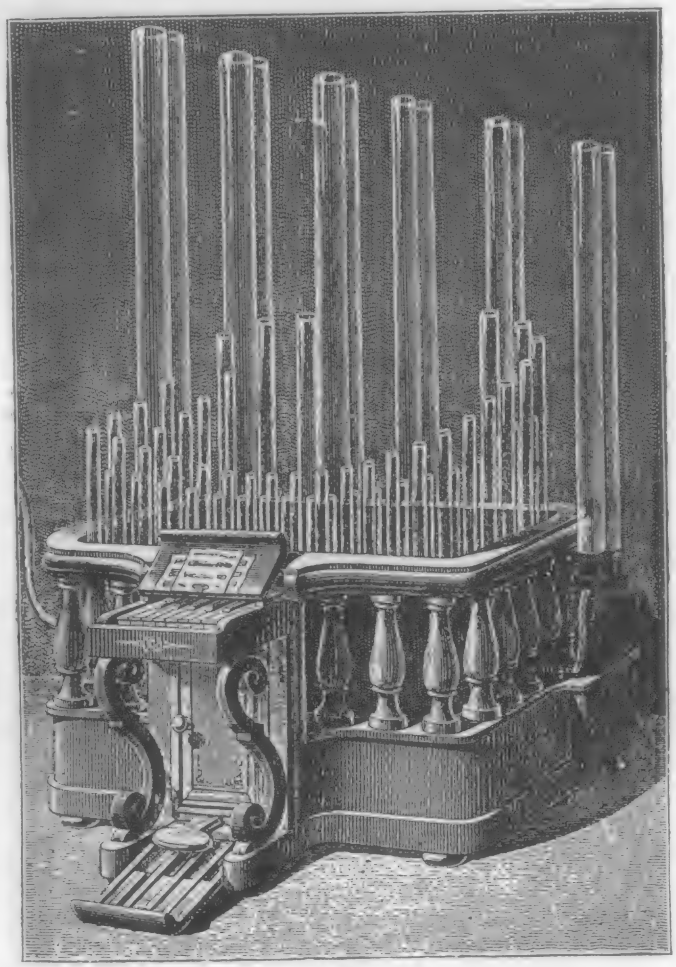


FIG. 110.

I'd like to believe this pyrophone exists. Maybe, bought by a circus, museum, or music eccentric, it waits somewhere in storage for a fellow enthusiast to rediscover, dust off, and invite us all over for a listen.

Since EMI readers have over the years shown a sincere interest in the kinetic visual aspects of experimental instruments, as well as music machines employing automatic actuation, I will broach the next subject. Up until now, pyrophone discussions have centered, reasonably enough, around how the quality of a flame affects the quality of a sound. Let's turn the premise around. I believe extravagant visual effects wait to be discovered by examining the opposite... how the quality of a sound can affect the quality of a flame.

Figure 91 – Dr. Koenig's Manometric Flame. This device consists of a small wooden box, one side of which is closed by a thin membrane (m). In its day, this material was gold-beater's skin (large intestine of oxen upon which goldsmiths would hammer the soft metal into delicate sheets) or goutchoue (India rubber). Il-

luminating gas entered through the lower orifice (u). At the other opening (b) a burner pipe is fastened allowing the gas flowing out of the manometric box to be ignited. It's easy to visualize that the behavior of the flame will be readily modified by disturbances of the membrane, including the disturbance of sound pressure.

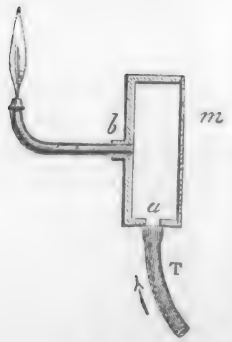


FIG. 91.

Figure 111 — Sensitive Flames. Professor John Le Conte first observed sensitive flames in 1857. Unlike the fire of the manometric apparatus above, these flames do not rely upon the excitation of a diaphragm to modify their behavior. Rather, they are directly affected by sound waves in the immediate vicinity without further mechanism beyond standard burners. The drawing at the left of figure 111 illustrates ordinary illuminating gas burning at the usual pressure. In this state the flame is virtually unaffected by sound waves. If, however, the gas pressure is increased to just below the point of flaring it will be observed that the correct pitches from organ pipes, flutes, etc., will cause the flame to branch out into undulating tongues as represented in the drawing to the right.

Figure 112 — Steatite Sensitive Flames. Issuing from what Reverend Zahm refers to as a steatite burner, the flame pictured on the left is adjusted to a length of about twenty inches. Much more sensitive than the flame pictured in figure 111, this flame will adjust itself, Zahm reports, to the slightest of sounds. " Walking across the floor, tearing a sheet of paper, shaking a bunch of keys, or whistling, will set it in commotion. Certain sounds will cause it to change its length and form, others will make it roar, while others will cause it to drop down to a short non-luminous flame" (as pictured on the right). Zahm also notes that vowel sounds, especially those containing the higher partials, like a, e, and i, cause a marked agitation of the flame.

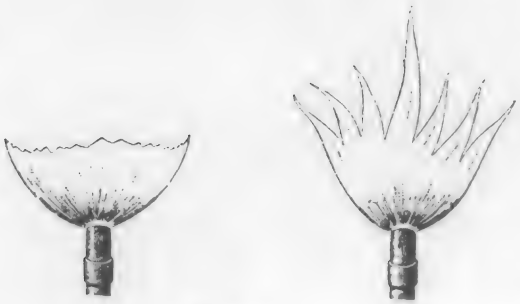


FIG. 111.

Figure 113 — Geyer's Sensitive Musical Flame. Working upon the principle of intersecting a sensitive flame with a section of wire gauze to increase the flame's responsiveness, Mr. Geyer, of Steven's Institute of Technology, furthered this technique by introducing over the flame a glass tube which rests upon the gauze. This creates a sensitive *musical* flame. Geyer's apparatus produces within the tube an exquisitely sensitive flame of about seven inches in length. As the tube and gauze are raised the flame becomes shorter, less luminous, until it " finally becomes violently agitated and breaks forth into song." The tube and gauze are now gradually lowered until the flame is just silent. At this point the flame is smooth and quiet, but the very slightest sound in the range of its sensitivity causes the fire to burst into song, holding its note as long as the triggering noise is present.

Figure 114 — Sensitive Smoke. Here, in place of volatile gas, is a delicate stream of smoke issuing from the steatite burner. On the left is illustrated the condition of the smoke in a silent environment. On the right, the same stream of smoke is seen shortened in height while expanded at the top, now being in the presence of sound to which it is responsive. Smoke, so closely associated with fire, set to action in this way will find a welcome place in the pyrophone design I am about to describe.


FIG. 112.

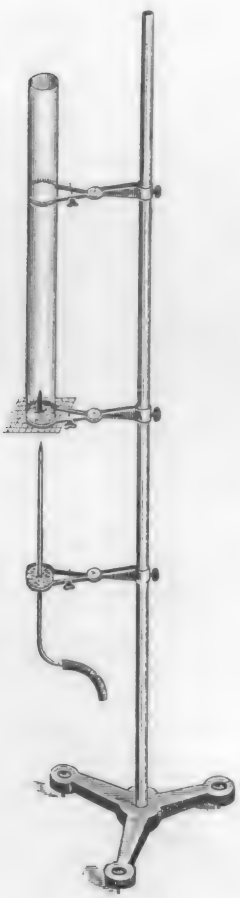


FIG. 113.


FIG. 114.

First a word about the derivation of sensitive flames. My first assumption was that the flame was itself sensitive to sound. While there are examples of this, the active mechanism behind the sensitive flame is a bit less obvious. The shape of a gas flame is greatly dependent upon the friction that the gas is subject to as it leaves the burner. A combination of gas pressure and burner design subject the jet to various patterns of turbulence. These burn patterns are altered by sympathetic vibrations of the burner as it is set to motion in response to nearby sounds, thereby resulting in the production of sensitive flames. This interaction is present in all such situations where a sensitive nozzle, as is perhaps more accurate a description, emits a jet of gas, ignited or not, liquid, or smoke. I suspect then that burner tubes of different lengths could influence which frequencies their sensitive flames respond to. I would also guess that small sound-catching diaphragms of various shapes could be designed to slide up and down the tubes thereby further tuning the responsiveness of the burner and shape of the flame. I can picture this principle being of value in both standard

sensitive flame configurations and sensitive musical flame designs as well.

Of what value are imaginary instruments? I'm of the belief that they're of great value, and while not a pyrophone builder myself I will yet hazard the following description hoping it might inspire a bit of dreaming.

THE FLAME COMPONIUM

The Flame Componium*, an automatic instrument having no keyboard or pedalboard, would be controlled by the sounds occurring around it as well as by its own sounds once begun. The sounding mechanism would employ variations upon Geyer's sensitive musical flame (figure 113), while silent sensitive flames (figures 111, 112) would spring-up amidst the ranks of musical pipes. These pipes, each consisting of a Geyer arrangement adjusted to quiet the flame at the threshold of song, would be situated as in the pyrophone with the various glass tubes held in a supporting rack. Each tube would be adjusted to its own triggering frequency, that being the sympathetic vibration of the steatite burner (or whatever supply/nozzle employed) in response to targeted surrounding sounds, thereby causing the assorted flames to flare into song independent of one another. As mentioned earlier, this fine-tuning might be had by varying the length of the burner supply tube, adding sound-catching diaphragms to differing supply tubes, or maybe even mounting the tubes themselves on tuned tines or plates of some type to share in their host's vibration. Elements of chordophones, idiophones, and membranophones could all provide ideas for workable resonant-body designs to aid in the tuning of the Geyer mechanism. Gas pressure, burner type, glass tube dimensions, and many other factors would undoubtedly come into play as both actuating frequency and pitch production for each flame are considered.

Depending upon the location or installation of the instrument, different tunings of both triggering and sounding frequencies might vary. While more abstract relationships between sounds that trigger the flames and the pitches they produce in response could be intriguing, simply singing a note yourself and hearing the instrument take over the note or begin to harmonize with it would also be fascinating. Tunings of both triggers and voices could be made appropriate for accompanying anything from a church choir to lumbering scrap yard machinery.

My next consideration would be to utilize arrays of standard sensitive flames for fire choreography. I'm sure that multi-jet sensitive flame configurations could be spell-binding. A series of burners running down the length of long curved gas supply tubes could produce dancing sheets of flame in response to triggering and singing flame sounds. A large circular supply tube with high-pressure burners stemming from the inside of the hoop, directing several dozen long sensitive flames toward its center, might create a bedazzling fire kaleidoscope of sorts. Sensitive smoke streams could add a bit here as well, possibly as an undulating backdrop or curtain for the fire to play against.

A PYROTECHNIC COLOR ORGAN

Continuing to look to fire as the inventive medium, designing color organ capabilities for individual (or sets) of flames would also seem to be within reach. Pyrotechnic chemicals are available to reliably produce six basic colors. Red, by means of strontium nitrate or carbonate; orange, by iron or charcoal; yellow, by sodium salts; green, by barium nitrate or chlorate; blue, by copper salts (and a little hocus-pocus); and white, created with magnesium or aluminum. Fireworks recipe books will aid the interested experimenter and caution against the careless usage of certain chemicals, a couple of which I've just named.

I had the questionable distinction of being the only kid in the neighborhood who " blew off his hands." No, it wasn't really so bad, but that's how the rumors spread. I had been trying to make firecrackers (since they were illegal to purchase where I lived), and in the process managed to split the living room table in half, blow out the nearby lights, awake all the neighbors, and knock myself unconscious. It was quite a mess, really. A team of surgeons operated on each hand, neither hand being seen again for a very long time. Many bandages, stitches, (and looks of great wonder from the neighborhood kids) later, my recovery took hold, and I survived reasonably intact. Yes, I still make fireworks, with caution being the greater of my tools. Fire artists are well aware of the medium's dangers. If, however, anyone wishes to apply any examples or variations of the following to create a pyrotechnic color organ, I must stress the importance of learning the risks involved, and suggest the use of very tame chemical compositions.

For the sake of simplicity, let's look at one flame and one process to adjust its color relative to the audio frequencies present. Picture the flame, sensitive or not, issuing from a burner. Adjacent to the flame are six small containers, each containing different pyrotechnic color chemistry in powdered form. From each container runs a pipe and nozzle aimed at the flame. Into each container runs another pipe, this one coming from a small electric blower, one blower for each container. Both pipes locate into the container above the composition (pyro-dust) level.

If you're familiar with the common color organ circuit that connects to a stereo system and modulates the brightness of different colored bulbs relative to frequency sets, then you know by now where I'm headed. A six channel color organ of this type would be designed, with the electric blowers now replacing the lights. A microphone would supply an amplifier with the instrument's live sounds, frequencies would be divided by the color organ, and blowers would introduce the appropriate airborne color chemistry to the flame. Cautions might include in-flame chemical mixing from multiple containers, or even back-flash into the containers themselves. Chemistry suspended in aqueous solution and aspirated into the flame is also another possibility for coloration, and may be a little on the safer side. Composition-coated wires could be spooled through the flame. Paper or sawdust soaked in color solutions might be injected into the fires, or allowed to drift into sensitive flame curtains. Variations upon this theme are boundless.

Other pyrotechnic sound sources come to mind and could easily find themselves incorporated into the instrument's design or performances. Japanese "mad lions," known in the States as whistle shells, produce the wild shrieking expected in most fireworks displays. Rather than air passing over the end of a hurtling tube, or propellant burning out of a tube and somehow using it as a whistle, the real source of the sound is the burning paste or plastic compound in the firework itself. Odd as it may seem, sodium salicylate emits this screeching all on its own during combustion. Another common pyro noise is the crackling of certain aerial shells, sounding at times like the tearing of giant

*The original Componium, designed in 1821 by Dietrich Nicolaus Winkel of Amsterdam, is now housed in the museum of the Brussels Conservatoire. The instrument is a pipe-based orchestrion containing a mechanism capable of automatically composing variations on any musical theme supplied to it. A pair of large rotating cylinders were at the heart of this composition process, reportedly requiring an audience to listen a mere 138 billion years for all variations to be heard.

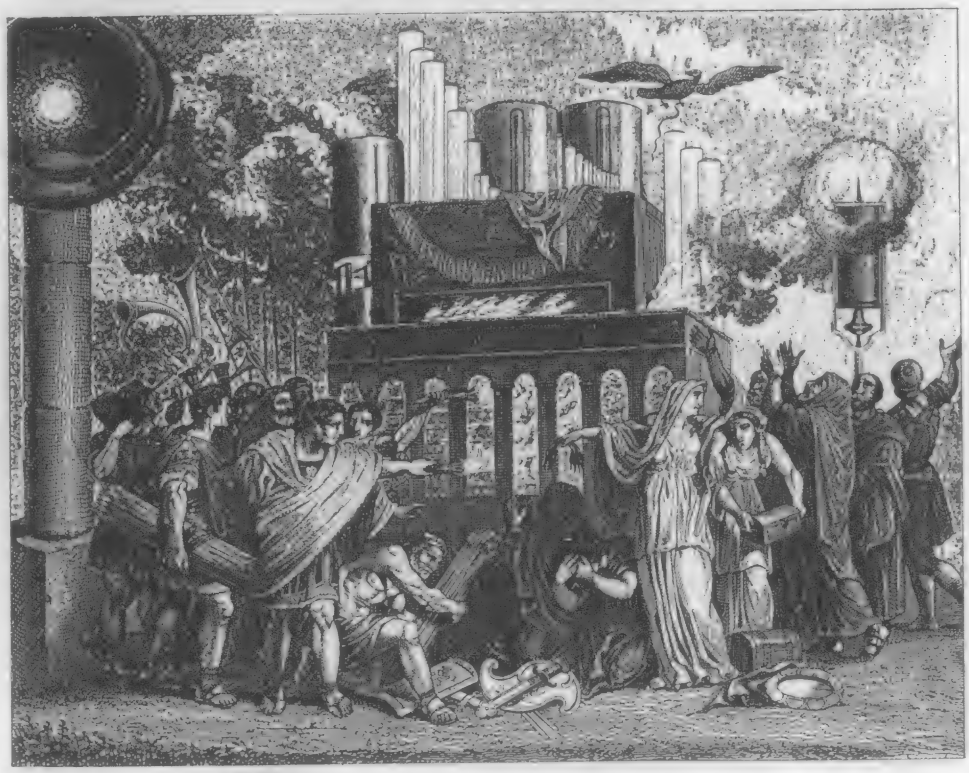
COMPOSITE ENGRAVINGS

FACING PAGE:
Flame Componium with Sensitive Plasma Generator, Atlantis. A festival and ceremonial componium, the instrument is tuned according to the occasion, spontaneously accompanying the singers around its base. Pictured is the summer solstitium liturgy in which the choir's vocalizations not only trigger harmonies from the componium, but also shape and sustain the various glowing nebulae produced by the sensitive plasma generator. Unlike flame or smoke, the plasma was self-responsive to sound in both shape and color alteration. A hydrogen gas generating station is located beneath the musical pipes.

THIS PAGE ABOVE:
Flame Componium and Infrasound Relay Station of forest planet Oci-Tèr. Quartz resin musical flame pipes respond to surrounding natural sounds, different note sequences expressing patterns of animal behavior, changes of weather, season, etc. Paired sonic relay towers, seen firing, respond to distant station's infrasound, sending complex beat-frequency infracodes planetwide. Stations are water-cooled, and use natural gas immediate to the installation. Cutaway view shows hollow interior of major infrasound chamber with flame above pulse gap.

THIS PAGE BELOW:
Roman Funerary Flame Componium, triggered by cries of mourning, responds with fiery wails, announcing the mourner's sorrow to the heavens. The componium's self-adjusting burners slide within the pipes producing great howls that, like cries of grief, drop in pitch over their range. Multijets fire within large nested resonators producing deep tympanic booms in response to pipe rank crescendos. Ritual objects, along with possessions of the dead, were set afire inside the instrument's structure. Burner fuel is unsure. Symbolic sensitive flame and smoke apparatus flank the instrument.

Composite engravings constructed by Q R Ghazala. Based upon works by Gustave Dŏré from **Dante's Purgatory And Paradise**, translated by H. F. Cary, published by John W. Lovell Co., N.Y., (pub. date in this very old book is not given), and artists H. Winkles, R. Schmidt, Madel III, and G. Feldmeg from **The Complete Encyclopedia Of Illustration**, by J.G. Heck, Park Lane, N.Y., 1979. First pub. 1851 as **Iconographic Encyclopaedia of Science, Literature, & Art**.



sheets of fabric. Although this effect is sometimes caused by small firecrackers embedded in the shell's flammable composition, the use of properly prepared magnalium is also very effective. Colored smokes, other pyrotechnic light sources, even simple exploding crackers could come to the call of fire art and to the aid of the pyrophone builder.

Can I see problems with this design? Absolutely. It's easy to assume that the instrument might self-trigger, responding to its own sounds, ultimately resulting in the whole system just sitting there with all pipes blaring at full-blast. Wow. But then again, on the other hand, maybe phase changes and beat-frequencies will continually cancel-out certain musical flames, causing differing sets of singing tubes to come to life while others die away, cycling the entire instrument through spontaneous and ever-metamorphosing musical fire dances. My three decades of instrument building have taught me that nearly every problem has its own solution, and that the pursuit of answers is often more beneficial the longer it takes. For the Flame Componium I would turn my attention to tuning changes, pulsed gas, automatic shut-offs with pilot-light or electronic auto-reignition, thermal sensor voice control, plus who-knows-what else to solve the problems or create the desired performance.

I imagine the Flame Componium to appear as a living mass of fire and sound. Simply walking toward it may cause the instrument to begin to compose. Or perhaps it could take the form of smaller sculpture; a series of similar works each consisting of only several singing flames around which arrays of sensitive flames dance. The Flame Componium could be central to an installation, with various silent sensitive flame sculptures moving in response throughout the gallery. Strongly tying together both the sights and sounds of these magical flames into kinetic artworks would offer seemingly endless possibilities for creating fascinating experimental instruments.

Here I will turn the matter back over to the pyrophone specialists who know much more than I about the subject. I hope these engravings and thoughts about automatic pyrophone actuation, as well as the sensitive flame accompaniment, have added a bit more to the forum, and will contain something of value to EMI's readership. Perhaps a pyrophone builder will reflect upon these ideas in a future issue. Till then, I'll enjoy the thought that now it is us behind the curtain, while still, at the same time, the Wizard is real.

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Experimental Musical Instruments, Volume 10 #1, Volume VII #2, Volume III #6 & #4

Special thanks to Dr. Cynthia Striley Ph.D., for technical information regarding her own pyrophone experiments, as well as thoughts on fire color organ designs.

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Q.R. Ghazala's composite engravings of imaginary Flame Componiums are available, hand-titled and signed, as a set of three posters (high-quality B/W photocopy, 22" X 17") for $20.00, including mailing tube and postage. Payable to Ghazala at the Sound Theater address listed. (Overseas add $12.00 for extra postage and packaging.)

THE BANJO KING

By Frank Holmfield

This article was first published in 1901 in The Royal Magazine. It appears now as part of EMI's ongoing series of reprints of early magazine articles relating to musical instruments. Apologies for the quality of the graphic reproductions – we were unable to reproduce from the original pages, and are working instead from photocopies. EMI thanks William Galvin, himself a juggler and circus-style entertainer of the highest order, for doing the research that turned up this article.

The article's historical context is the Boer War between the British and the descendants of Dutch settlers in South Africa.

Mr. Piper holds in each hand a full-sized banjo, and, while swinging them to and fro, plays a tune.

When the outlook in South Africa was at its bleakest, when military blunders were followed quickly by disasters to British arms, and many a heart was rent with grief and sorrow, there was one man, at any rate, who strove his level best to rouse the drooping spirits of those who lived with the thunder of guns beating into their very souls.

And, indeed, the enlivening effect of a banjo manipulated by a player who is a thorough master of the art, must have proved most welcome to those whose ears were accustomed more to the rattle of the rifle and the wails of the wounded. And Mr. Franco Piper, who holds the unique distinction of having played the banjo through seventeen months of the war, where and whilst that war was most felt, is not the man to have spared himself where the "bink-a-bank-a bong" of his strings was wanted.

At camp concerts, or in the wards of a hospital, his cheery music "bucked up" many a despairing heart. Up and down the line of communications he flitted, from centre to centre, from camp to camp, welcome everywhere – for caterers of amusement were few and far between; so he and his "stud" of banjos were kept as busy as the proverbial nailer.

As a banjo-soloist, Mr. Piper has few equals; in fact, it has been said of him that he is the King of banjoists. Apart from this, however, he certainly has no equal as a trick banjoist. Those who saw him on his recent visit to this country, when he appeared at the London Pavilion, will readily admit that his is one of the most marvelous performances in the world of entertainment.

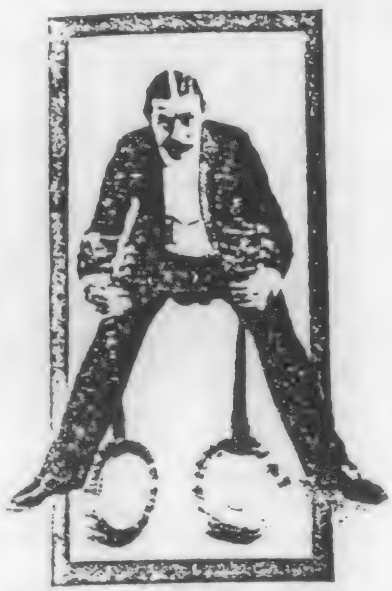
When the first tune is finished he changes rapidly his position and plays a march, while the swing of the banjos marks the time.

What Cinquevalli can do with billiard balls, Mr. Piper can accomplish with banjos – with this important difference: Cinquevalli only juggles with the ivories, whereas our South African visitor juggles with banjos – and plays them at the same time! Whilst the banjos are merrily "flying in the air" or pirouetting about his feet in all sorts of extraordinary ways, Mr. Piper's fingers find time to touch the strings to such fine effect as to send abroad a perfect flood of melody!

How is it done?

Well, they say that genius is the perfection of an aptitude for taking pains. And that seems quite true in this particular case. Even as a baby, Mr. Piper yearned for perfection in the art of playing a banjo. At three he was able to play tunes with infantile ardour, if not with touching expression. And he continued to "pull the strings" so effectively that early in his teens he was regarded as a first class soloist – the best in South Africa.

When he began to practice banjo-playing extraordinary in the way of accomplishing juggling feats to the accompaniment of his own music, he was a mere youth. Years were spent in perfecting this branch of his professional work. For three hours a day he never ceased to practice during four years for one of his more elaborate "tricks". It is indeed due to this sort of hard work that he now stands unique as a juggling banjoist. The accompanying photographs will give the reader some idea of his ability in this line, but one



He places the banjos on the floor, causes them to rotate at an enormous speed, and plays a tune at the same time.

A variation of the above feats. One banjo rests on the upper end of the other, and both rotate, but in contrary direction.

One banjo is rotating to the left, the other to the right, while the tune is played without an error.

He rests a banjo on the floor, and, playing a tune all the while, causes it to move with a revolving motion across the stage.

must really be present at his entertainment to fully understand how wonderful it is. Mr. Piper begins by taking a pair of full-sized banjos in his hands. Facing the audience, he swings the instruments alternately to and fro with increasing impetus. His hands and fingers are in the position shown in the photograph viz., at the upper portions of the strings. As the banjos swing rapidly backward and forward the player's fingers are busily at work, so that a tune, produced with the utmost precision and in good time, floats through the air. The effect of the swinging movement of the instruments is decidedly a great improvement. In imitating church bells, for instance, the illusion is complete. The performer, when he has completed the first tune, next assumes a new position. He stands with left or right side to the audience and swings the banjos sideways – as the pendulum of a clock moves – the pace gradually increasing. The tune has changed from a coon ditty to a military march, perfectly harmonized, one set of fingers playing the treble, the other set executing the seconds. But these feats are mere preliminaries. There is something more wonderful to come. Placing the banjos upon the carpeted platform, Mr. Piper causes them to rotate at high speed – so high indeed that the instruments appear to the spectator as mere blurred forms. Fast as they are traveling, however, Mr. Piper manages to touch the right strings at the right moment as they run around beneath his fingers, and with such wonderful effect that not a single note is missed during the playing of a popular air well known to the audience. When one considers the marvelous nimbleness and touch of finger required to get through such a performance without a blemish, one begins to realize that Mr. Piper has earned this reputation that entitles him to be called the Prince of Banjoists.

But if the foregoing feat is wonderful, what of the next? It is remembered that the two banjos revolved in the same direction. Now we see two piccolo banjos, placed upon a small table, and rotating a full speed, each in a different direction – *one whirls to the right, the other to the left!* Even the un-musical spectator will, under the circumstances, appreciate the difficulty of the performer in playing the same tune on the two banjos.

The movements of the fingers of the left hand must be entirely different from those of the right hand, to meet the strings at the supreme moment when they pass below the fingers in their circular flight. And Mr. Piper never makes a mistake; the most musical ear in the audience will fail to detect the slightest error of sound in the harmony.

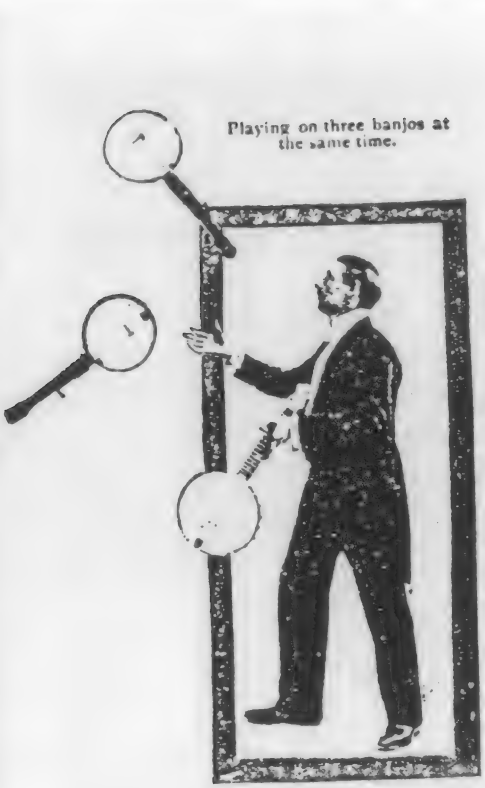
This feat is followed by another of equal, if not greater, skill. As will be seen by reference to the photograph, the pair of banjos are manipulated whilst the lower part of one rests on the upper end of the other, the two revolving at tremendous speed, but in contrary directions! I don't like to think of the fate of any ordinary banjo player who attempts to imitate this feat. Colney Hatch is the only possible sequel. It may frighten off ambitious ones when I state that only after a couple of years' hard practice was Mr. Piper satisfied sufficiently with this feat to perform it in public.

Another extraordinary way of playing a popular tune on a banjo is next illustrated in Mr. Piper's quaint way. He takes up a full-sized instrument, and, walking to the left side of the stage, rests the lower end on the carpet. He now proceeds to whirl the banjo in such a way that its rapid revolutions set it moving directly across the stage to the other side. As the banjo travels thus, Mr. Piper's fingers are as busy as ever and whilst the banjo is whirling its way the favorite tune of "The Old Folks at Home" is flung out, with all its pathos, into the auditorium, where it is greeted with the enthusiastic applause which this good old song never fails to produce.

And now the most amazing part of Mr. Piper's playing is introduced. It takes the form of a series of juggling feats with one, and two, and three, and four, and even six banjos. The quickness of eye and the unerring touch of finger, displayed during these feats are truly marvelous, and offer emphatic proof of what patience and perseverance can do for those who are built that way.

First of all, the Prince of Banjoists takes up one of his big "stud" of instruments. He throws it in the air, as Cinquevalli does a billiard ball. It sometimes makes half-a-dozen circles in the air before the strings come once more under the player's mobile fingers; but it always gets there at the precise moment when a string or two must be touched to fill in the necessary note of a tune, and that note is lightly touched and the banjo is once more well on its acrobatic career in the air.

Then another banjo is added, and both sets of the



Playing on three banjos at the same time.

Playing a tune on four banjos.

A feat Mr. Piper has not yet ventured to perform in public. He plays a tune on six banjos at the same time.

performer's fingers are called into use. One up, one down; but the right note is always "twanged" at the right moment, and the tune, be it waltz or march, is rendered as perfect in time as if the banjos rested at ease in the arm of the player. Still another banjo soon makes its appearance, and the trio are sent careering in the air amidst intense excitement, for the audience are always on the look-out for a grand smash. But it never comes. Keeping perfect time to their own tune, the three banjos leave the skillful hands of the player only to descend into them in turn at the proper moment. Now a fourth instrument is added. Yet the performer never quails. He is as cool in paying attention to and manipulating the quartet as he was when only one required looking after. Further, the musical effect is enhanced. In juggling one, two and three banjos, Mr. Piper only plays the air, but as soon as the fourth instrument joins the skyward flight the performer plays the air on the banjos that fall into his right hand and the "seconds" on the pair to which his left hand is devoted. The effect is really charming.

Up to the present, Mr. Piper has not gone further than juggling with, and at the same time playing upon, four banjos in public. But he is at present hard at work on an even more sensational act – that is, juggling whilst he plays a harmonized air with no fewer than *six* instruments. He kindly allowed himself to be photographed whilst performing this prodigious feat, which the British public may see for themselves on his next visit to this little corner of the earth.

During his professional trips up and down the lines of communications and from camp to camp in South Africa, Mr. Piper did not fail to have a share of experiences of a more or less adventurous nature.

One night he was hurrying back to his lodgings from a big marquee where he had given his entertainment before an audience of civilians and the military. Suddenly he was challenged by a sentry. So unexpectedly was the challenge hurled at him from the darkness, that, for the life of him, he could not recollect the countersign, nor indeed, utter a word. The next moment he heard the rattle of the sentry's rifle as it was brought to the "present"! Then a brilliant thought saved the situation. He carried his banjo under his arm and, luckily, it was uncovered and ready for use. In an instant the familiar strains of "Wait Till the Clouds Roll By" were strummed out. The sentry, laughing heartily, recovered his rifle and stood at attention and growled: "Advance, Mr. Piper and banjo – all's well!"

A rather pathetic little incident, in which Mr. Piper and his banjo-playing took part, happened in Bloemfontein. One evening he sat at the open window of his "diggings" – which were in a house on the outskirts of the town – practicing some tunes of his instruments. As he played the familiar air "The Old Folks at Home" he heard the sound of someone weeping coming out of the darkness. Mr. Piper ran out and, striking a light, discovered a young Boer, wounded badly.

The poor fellow was in a dying condition. Near the end he asked, in fairly good English, for the tune he had heard as he lay outside to be played again. Mr. Piper did so, and as the last bars of the melody trembled out the Boer fell back dead.

BAMBOO

The Giant Musical Grass

by Richard Waters

An overview of this versatile plant as it applies to instrument design and sound: How to select, grow, harvest, and utilize bamboo.

This is the first of three articles on bamboo by Richard Waters, instrument maker and bamboo cultivator. In this first part Richard discusses available bamboo species and their characteristics. In the second he will cover bamboo cultivation, and the third will focus on musical uses.

Part 1: Selection Of Species. *IS BAMBOO FOR YOU?*

Acupuncture needles, aphrodisiacs, arrows, beer, beehives, bikes, bridges, baskets, cages, canes, chicken feed, chopsticks, concrete reinforcing bar, crutches, dams, diesel fuel, fences, firewood, fishing poles, furniture, gutters, houses, irrigation, kites, ladders, living screens, looms, medicine, musical instruments, packaging, paper, plywood, pipes, rakes, rings, ropes, scaffolds, rafts, string, toys, teahouses, tents, umbrellas, water pistols, waxes, windmills, wine, whistles, xylophones, yurts. It never ceases to amaze me how many things (besides musical instruments) are made from bamboo, and yet this plant is utilized so little outside of third world countries especially in the U.S. Education about this giant grass is needed, as most people in the U.S. do not know that there are two basic types of bamboo, *clumping* and *running* (or *pachymorph* and *leptomorph*). The *American Bamboo Society* is slowly attempting to correct this by educating its membership in new bamboos being introduced into the U.S. The A.B.S. publishes articles, reviews books about bamboo in a quarterly newsletter, and makes available to the public a free list of bamboos currently being grown in the U.S. and where to purchase them (nursery list). Send a business-size S.A.S.E. to the A.B.S., P.O. Box. 640, Springville, CA 93265 and request the *source list.*

As to which bamboo to select: Depends on where you live (minimum temperature) and future instrument building projects. For large timber bamboos with big air cavities there are about a dozen running bamboos (*Phyllostachys* genus) available in the U.S. that are hardy to O°f., and about six clumping timber hardy to 15°f., and another dozen clumping timber bamboos that are hardy to 32°f (mostly *Bambusa* genus) If you are considering purchasing and planting bamboo I highly recommend that you write for the free list as it may list a nursery source near you. If you want to really immerse yourself in bamboo knowledge then join the A.B.S. and your local chapter for $30. per year. The local chapters are across the U.S. and have sales and educational workshops. They also have bamboo trading among the members, which is how this collector accumulated a goodly number of bamboos and is probably the most economical way to acquire bamboo starts. The above-mentioned source list will have information about how to contact your local chapter of the A.B.S. The A.B.S. also lists companies that sell cured culms. Some of the nurseries listed with the A.B.S. will ship plants.

In this article all botanical names will be italicized with the Genus name in bold type, and the species name with no capital.

If I live where it is cold and snowy can I grow bamboo? Sure can. In fact there are three bamboos that are hardy to minus 20°f. These are *Phyllostachys nuda* (30 ft. full sun running) and *Fargesia nitada* (purple culms) and *Fargesia murielae* (both 12 ft., shade, clumping). Most dwellings that are heated in the winter have a small micro-climate usually on the south side of the house and this area can be utilized. P. aureosulcata is hardy to minus 10°f. Many bamboos are hardy to 0°f. and if you live where the temperatures do not fall below 12-15°f. then another group of clumping bamboos is available to you and this is the genus *Bambusa.* Within this genus is a wide range of sizes and appearances, but all like full sun. Some of the larger ones are *B. oldhamii, B. tuldoides, B. dissimulator, B. Beecheyana, and B. ventricosa.* This group, depending on how cold it gets, grows up to 55 feet high and the thick wall culms are 3 - 5 inches in diameter. *B. Beecheyana* is noted for its tasty shoots and *B. ventricosa* (common name Buddha Belly) is noted for its swollen-distorted inter-

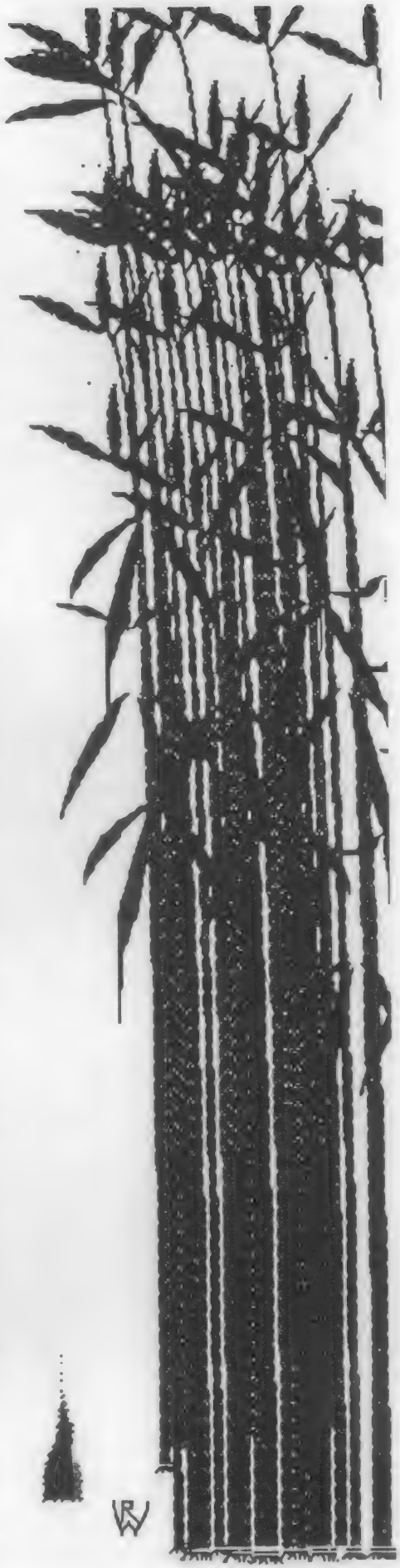
nodes if grown under dry conditons. *Bambusa vulgaris* and its variegated form *B.v. "Vittata"* (both 50 ft. x 4") are the most common clumping timber bamboos found throughout the tropicals, but only hardy to 28°f. There are medium-size clumping bamboos in the *Bambusa* genus that are suitable for smaller projects that require culms in the 12 inch diameter range. These are *B. multiplex* (hedge bamboo 35 ft.), *B.m. Alphonse Karr* (very decorative with variegations on the culms 35 ft.), *B.m. Silverstripe* (40 ft.; tiny, variegated leaves; weeps heavily making the mature plant look like a variegated haystack.), and *B. textilis (* 40 ft., hardy to 13°f).

If you live in one of the tropical zones within the U.S. like Miami, San Diego, or Hawaii, you can grow some of the super giant timber bamboos like *Dendrocalamus gianganteus,* and *D. strictus*, which is widely used in Southeast Asia for musical instrument construction. The thorny, thick-walled *Guaduas* from South America are frequently used in house construction. All of these can grow to 100 feet with culm diameters being 8 -12 inches, but will not survive a frost, plus at this writing (1994) they are expensive.

Generally speaking the majority of the newly introduced bamboos coming into the U.S. come through Miami, Southern California, or Seattle, Washington. So if you are seeking something rare and elusive these are the areas to focus on. Otherwise seek out species that are established within the U.S. as these will be less expensive and more available.

Collectors are introducing new species to the U.S., the most noteworthy being the *Chusquea* genus from central and south America. These normally do not grow over twenty feet and their culms are solid with no air space between the nodes. They are noteworthy because of their being a clumping bamboo, yet hardy to 0f and capable of growing in full sun. The fact that the culms only grow to 1 inch in diameter and do not have an enclosed air space restricts their use for some musical instrument design, but they are excellent for mallet handles. Another group that might be of interest is the *Fargesia* genus as several new introductions have come out of quarantine within the past few years. As these are small bamboos (12 feet high, 1/8 to 1 inch in diameter) they would be suitable for things like mallet shafts. The graceful Mexican Weeping bamboo (**Otatea**, acuminata, aztecorum; 15 ft. x 3/4", hardy to 15°f), with long, noded purple/brown culms, is also suitable for mallet shafts and other small-diameter projects.

So far I have been talking mostly about clumping bamboos which do not spread but rather get larger in one spot. Within the running bamboos is the large genus *of Phyllostachys* from Asia. Most of the timber bamboos grown across a wide variety of land within the U.S. are Phyllostachys. These are quality wood bamboos used for all manner of construction and musical crafts like Shakuhachi flutes especially P. *bambusoides* and *P. vivax* (72 ft. x 6 in.), P. *h. pubescens* (Moso 75 ft. x 7 in.), and *P.n. Henon* (54 ft. X 3 in.). These four timber bamboos are the most common running timber bamboos in the U.S. All of these Big Boys can take zero degrees and full sun but don't expect them to get maximum size without fertilizers and water. A well established grove can push new shoots up at the rate of six inches or more per day provided moisture and nutrients are available. Other timber-size *Phyllostachys* that should be considered are *P.n. Bory* (brownish splotches on green culms) *P.n. Megurochiku* (brown/black striped in culm groove). Also if you live where gophers are not a problem P. *viridis* and its close cousins *P.v. "Robert Young"* (green stripes on yellow culms) and *P.v. "Houzeau"* (yellow stripes in culm groove) both are impressive. All of these grow to at least 50 feet or more and have culm diameters of 3 - 5 inches when mature. Some of the medium-size *Phyllostachys* that are worthwhile are P. *dulcis* (40 ft. x 3 in.), *P. nigra* (Black Bamboo 30 ft. X 2 in.; 0°f.*)*, *P. rubromarginata* (32 ft. x 2+ in.), P. *virdi-glaucescens,(35 ft.* x 2 in.), and *P. meyeri* (33 ft. x 2 in.). Even Fishpole or Golden Bamboo (*P. aurea* 27 ft. x 1" +; 0°f.) can be utilized for crafts as it has unusual and quite beautiful culm distortions for the first foot or two where it comes out of the ground. *P. aurea* is the most widely grown bamboo in the U.S. and consequently is more available than some of the others listed here. If you want something a little more decorative then consider *P. aurea*'s close cousins *P.A. Flavescens-inversa* with variegated culms, *P.a. variegata* with variegated leaves and *P.a. Koi* with both leaves and culms variegated all grow to 20-30-ft. and all have the unusual culm distortions. *P. aureosulcata* (yellow groove bamboo 27 ft. X 1" +; hardy to minus 10°f.) is an interesting bamboo which has yellow stripes alternating from side to side in the culm groove and about one out of fifteen culms will have a dog-leg turn in the culm which gives the grove an unusual look.



Graphics for this article by Richard Waters

I personally like to utilize the *Phyllostachys* genus as they are much easier to de-branch, having two branches that extend from the nodes whereas some of the other genuses including *Bambusa* have ten or twenty branches per node that are much thicker and more difficult to remove. Another genus difference is that most *Bambusas* have culm walls that are about twice the thickness of the culm walls of the *Phyllostachys* genus, which makes the culms heavier. The *Phyllostachys* is the most widely grown bamboo in the U.S. and is one of the better groups of bamboos for musical instrument design, as it has long fiber bundles and the hardness of the culms is just below that of oak. The *Phyllostachys* genus can be identified by (1) two branches that alternate side to side and (2) a vertical culm groove (indentation) that alternates side to side on the culm.

There is only one U.S. native bamboo worth mentioning which is Canebrake Bamboo, grown in the southeast U.S., but it is not considered quality wood. One bamboo of the *Arundinaria* genus (running) that should be mentioned as it has very high quality culms is A. *amabalis* (50 ft. x 3 in.; hardy to 10°f.). This bamboo is prized for making fly rods due to its resilient strength, and it is available in the U.S. For mallet shafts there are a couple of smaller bamboos that grow well in containers and like a little shade. These are *Pseudosasa japonica* (Arrow Bamboo, 12 ft., hardy to 10f) and *Chimonobambusa maorea* (Marble Bamboo, 8 ft., hardy to 15°f; both runners).

Basically speaking the majority of medium to timber-size bamboos grow best in full sun but they will also grow in half-day shade. The tropicals like *Bambusas* require high heat to attain their optimum size.

These are just a few of the several hundred varieties being currently grown in the U.S. It is estimated that there are more than 7000 varieties of bamboo in the world and every year another 25 - 50 varieties are imported into the U.S.. These are shipped to U.S. Department of Agriculture licensed quarantine stations where they must be grown for a period of one year to certify that they are free of disease. This plus the scarcity of the plant are the reasons that new introductions are initially expensive.

Probably the most often asked question about *running* bamboo is: *will it take over?* Yes, it will take over if you plant it in the wrong spot (near your garden, driveways, lawns, or foundations where they seek out moisture and food). Plan ahead. If you have the room then go for some big running timber bamboos, but if your space is restricted then scale down to clumping bamboos or perhaps grow your running bamboo in containers until more space is available. Here in northern California where we have dry summer the running bamboos tend to hang in close to the drip system, otherwise a new shoot will wither and not survive in summer. Bamboos can be grown in the southwest but additional precautions must be taken like not facing them into a dry, prevailing wind, mulching to preserve moisture, planting in a depression that gathers water (but has good drainage), and using drip systems. It also helps if you select those bamboos that do not have huge leaves as these require more moisture to look their best, plus large-leaf bamboos tatter in heavy wind areas. For those of you in areas where there is prolonged drought a drip system with spray emitters is a must. However most areas in the U.S. have sufficient rain to grow most bamboos. The addition of mulch and lots of organic compost helps. Frequent water and fertilizers equal maximum growth.

If you live in an area that gets rain during spring and summer and you have restricted space for growing running bamboos then some sort of rhizome restriction may be necessary. *This is the latest on controlling running bamboos*: plant on a small mound with a ditch around it. Flooding the ditch will further restrict the rhizomes. Or put an in-ground barrier around the bamboo. This can be plastic or concrete, and can be bottomless if it is deep enough (36 inches for timber-size runners and 24 inches for medium-size bamboos).The plastic barrier is available through nursery/horticulture supply houses. Harvest the culms for instruments/sound devices and/or eat the young shoots. (Most bamboos are edible but the running timber (**Phyllostachys**) seems to be the most popular for eating. *Bambusa* beecheyana is a clumping timber bamboo that also has tasty shoots. On most but not all bamboo the water must be changed once during boiling the shoots so as to reduce the bitterness.)

A mature grove of medium size running bamboo can easily occupy a 20 x 20 space while a timber bamboo minimum would be 40 x 40 feet. However with a barrier such as the type mentioned above a grove can be kept much smaller. If your next door neighbor is amiable then why not talk it over with him or her and maybe between the two of you can let a bamboo ramble on both sides of the fence line and both enjoy it. Bamboos may be planted on top of leach lines as the rhizomes stay within twelve inches of the surface and will not invade the lines as they are not deep-rooted. The small rootlets will be able to extract moisture from several feet down without creating problems. I personally find this a good place to plant bamboos as it provides a little moisture insurance, which is important here in California where we get no summer rain.

This is a rough overview of some of the species that are utilized in the world for crafts, especially musical instrument design. In the next segment of this article we will look at how to grow and harvest this versatile plant bamboo.

THE SOUND MERCHANT

John Herron, "The Sound Merchant," sends these notes on a simple,affordable,effective musical instrument:

An instrument that's very inexpensive and easy to make is the singing pot lid tree. I bought a pile of very cheap aluminum pot lids at a second hand store. Unscrewed the handles and drilled a hole in the center, 3/8" in diameter. After finding the pitches I preferred, I mounted the lids to an aluminum tube, 1" outside diameter. I drilled holes in the tube after measuring and marking where I wanted each lid mounted. To secure the lids to the tube I ran a bolt through them with cymbal felts against both sides of the lid, a washer to hold each felt snug, and put two nuts on each bolt to keep anything from getting loose. The whole rack of lids was then mounted to a stand with a tube clamp where I could adjust playing angle and height. I play the lids with a violin or bass bow, after putting a lot of rosin on the bow hair. Fine tuning can be done by grinding or filing the edge of the lids if desired. The sound is similar to a glass harmonica with each lid giving off a couple of different tones depending on where and how they're bowed. Small beads, etc. can be placed in the lids to create a buzzing effect. Miking the lids and adding electronic effects has been a great sound effect on recent movie sound tracks I've done.

Below left: John Herron with the singing pot lid tree.
Above: a larger pot lid installation.

John Herron became an instrument builder out of necessity years ago. Faced with the challenge of creating new and unusual sounds for movie soundtracks, commercials, and other musical recordings, he traveled far and wide to scrap yards, hardware stores, woodshops, etc. The building and testing began, and it hasn't stopped yet. John is available to demonstrate percussion sounds from all over the world, teach drum making and other instrument building, and offer ideas on creating moods with sound. Instruments from his large ethnic percussion collection can be rented for plays, films, etc. Tapes of his percussion-based music are available for $5.00 or trade. Write or phone John Herron at 3635 South 544 East, Salt Lake City, Utah 84106; phone (801) 268-6046.

Sound Symposium 7: Field Report

by Tom Nunn

If you travel as far east as you can go on this continent, you'll be there – St. John's, Newfoundland, the home of Sound Symposium. It is difficult to imagine that in this remote location one can find so much culture, so much tradition, and so much experimentation, all coexisting peacefully, in music and the arts. The Sound Symposium held July 15-23, 1994, was the seventh such occasion, the first occurring in 1983.

Organizers Don Wherry and Kathy Clark seem to have done the impossible – create a festival of diverse musics that benefit participants and audience alike in that diversity. So often, festivals will focus on a particular kind of music (new music, improvised music, folk music, jazz, etc.) or even on a particular instrument. And there are certainly advantages of such programming. But a special challenge lies in taking a holistic approach, as do Don and Kathy, seeking to create a place where music literally from all over the world can be experienced and shared in one delightful (if not exhausting) experience.

I managed to attend 33 of the 63 events presented during the nine day festival – whew!! I have never gotten so little sleep and yet had so much energy. This energy, which I think most everyone felt as well, comes from the communion of fellow musicians, the quality of the music presented, the diversity of styles, and not least, the genuine warmth and friendliness of the people of St. John's. The entire city seemed to be involved. As an example, one of the traditions of the Sound Symposium is the Harbour Symphony. There are always a number of boats and ships docked in St. John's harbor. Unbelievably, the Sound Symposium has convinced ship owners and captains to participate every day during the Symposium at noon by playing pieces written by various composers and Symposium participants! The scores are quite simple, consisting of six "staffs" (for up to six ships), each a sequence of squares, each square representing one second. If the square is blackened, the ship's horn is played. Each ship has two "players," one keeping track of a stopwatch or clock and the score, the other tooting the horn on the cue of the scorewatcher. (At least that was how it was explained to me by someone.) These pieces lasted up to ten minutes and could be heard throughout the city.

In addition to this, posters and signs (even a painted wall) advertising the Sound Symposium were found everywhere throughout the city. Galleries in town participated by displaying original instruments or installations; the Memorial University of Newfoundland (MUN) participated throughout, providing rooms for installations and workshops, and a concert hall for the first night's performance. Participants were also provided a place to stay, most often with local musicians and music supporters. I lived with a wonderful family, Len Penton, Deborah Clark and their son Joel. This made the whole experience all the more pleasurable, meeting such fine people in this way, swapping stories, talking politics, and sharing music.

Two main venues, LSPU (Longshoremen's Protective Union) Hall and Star Hall, hosted the bulk of the concerts, of which there were two and sometimes three each night, scheduled one after another. Both halls were quite good acoustically. The two venues are only about four blocks away from one another, so after the 7:00 concert, the audience simply *walks* to the other hall and attends the 9:00 concert. And after the 9:00 concert, of course, it was time to eat supper! So about 11:30 or 12:00, a bunch of the audience (and performers) would invade the 24-hour cafe half a block from Star Hall – the "Classic Cafe." I spent some very special hours there talking and laughing with new-found friends, not a small part of the personal benefit I got from this whole experience!

Throughout the nine days of the Symposium, a film crew was documenting it, and the CBC was recording some of the concerts, interviewing participants, and broadcasting them concurrently (though not live) throughout Canada – more evidence of the support and status the Sound Symposium has attained. Funding came from a variety of sources, including public, non-profit, and corporate organizations (see the listing below).

I received a grant from the Fund for U.S. Artists (Arts International) to pay costs of travel. As a participant, of course, I also received funding from the Sound Symposium itself. (Sadly, this cost to the Symposium has increased dramatically since the Canadian government raised its fee for a work permit to $125.00! – whether you're going to work for three hours or three years!)

I mention funding because that is so often the obstacle that kills creativity. Don and Kathy have overcome it through hours and years of hard work and dedication. It now takes two years to plan a Sound Symposium (originally it occurred annually). Of course, they are supported by a planning committee that obviously knows its stuff. And the Symposium provides an efficient and friendly technical crew. Maybe you can imagine the technical requirements of such a series of events! I can't. Production manager Ric Barela oversaw the whole operation, guaranteeing professional-level technical support to the participating artists, whose demands varied as much as the performances themselves. And these guys seemed to enjoy it! They were friendly, flexible and accommodating beyond the call of duty.

So, about the events, which included music and dance performances, workshops and installations: Again, the variety was astonishing, as was the quality of the acts. A handsome catalogue describes the 150 or so performers and groups involved in this year's Symposium. The field is too vast to describe fully in the limited space of an article. To get an idea of the scope

FUNDING ORGANIZATIONS FOR SOUND SYMPOSIUM 7

Public and non-profit entities: The Canada Council (Music & Opera, Visual Arts, Theatre, Media Arts, Arts Awards, Commissioning of Composers Program), Canada Council Touring Office, Canada Council Explorations, Dept. of External Affairs - Visiting Foreign Artist Program, Newfoundland & Labrador Dept. of Tourism, Canada/Newfoundland Cooperation Agreement on Cultural Industries, Canadian Heritage - Cultural Initiatives Program, Human Resources Development, The Newfoundland & Labrador Arts Council, the City of St. John's, the Laidlaw Foundation, The British Council, The Australian High Commission, Pro Helvetia, New Zealand Arts Council, Fund for U.S. Artists at International Festivals, and the Ministry of Cultural Affairs, Quebec. Corporations: Canadian Airlines, North American Vanlines/Household Movers, Hotel Newfoundland, Stewart McKelvey Stirling Scales, CBC Radio, Intra LeGrow Travel, St. John's Downtown Business Improvement Association, many individuals from the St. John's community, and the Society of Friends of Sound Symposium made up of private donors. The catalogue includes 16 pages of advertisements by supporters.

of this Symposium, I quote from Don Wherry's opening comments in the catalogue:

A traveling performance/radio ensemble will perform to the sounds of a pirate radio signal. Outdoor performances will include a string telephone installation in Quidi Vidi, an outport on the Eastern edge of St. John's. An after-hours slide, dance and voice performance in downtown St. John's, and a medieval-funk ensemble with song, dance and story-telling will occur under a full moon at the bunkers in the Cape Spear National Historic Site. Music from many parts of the world will be performed on the ancient Irish Dords, and the didgeridoo from Australia, the Mrdangam from Southern India, gamelan instruments, fascinating homemade instruments, made from PVC tubing, springs, wires, clay, and the proverbial kitchen sink. Dance will include the movement toward Butoh, improvisation, voice and electronics. Deep listening sessions by Pauline Oliveros will guide workshop participants into a spiritual/ ritualistic form of sound experience... Many concerts feature a spectrum of music, dance, comedy, theatre, jazz, world music, home-made instruments and several world premieres for the Newfoundland Symphony, the Scruncheons, and other Newfoundland based ensembles.

And if the music were not enough, participants had an opportunity to go on a whale watch – which I did. A fantastic experience! And the midnight outdoor performance at Cape Spear was very special – 800 people showed up!

Words cannot really adequately convey the deep impression the Sound Symposium made on me. It was certainly one of the best experiences of my life. I'm writing about it here to encourage EMI readers to check it out. Write for information (see below) and apply to participate. The Sound Symposium always presents experimental or original musical instruments as part of its programming. And we all know how rich a resource of such ideas there are out there. Experimental musical instruments have become an integral part of the new music presented today. They are heard in many different styles of music. So those interested in experimental instruments or handmade instruments would have a delightful time at the Sound Symposium.

Here's a tip. Anyone interested in going (not as a participant) might consider using frequent flyer miles to get there and back. Once there, the costs are not great. First, a general pass to all events costs a mere $200 (Canadian)! Average cost per event (63 events) is $3.17! Accommodations are reasonable, and food is delicious (and affordable) at the many cafes and restaurants in St. John's.

What's more to say? It's an memorable and enriching musical experience that I recommend to everyone.

The next Sound Symposium is scheduled for July 12 - 20, 1996. The theme of the 1996 festival will be "Islands of the World." For further information or to send a proposal for work to be presented, contact Sound Symposium at FAX (709) 753-4630 or e-mail dwherry@morgan.ucs.mun.ca.

Catalogs from the 1988, 1990, 1992 and 1994 Sound Symposiums are available for $5 each. Audio tapes from 1984, 1986, 1988 and 1990 are available for $8 each. A CD from 1994 is in the works. Order from Sound Symposium, c/o Sound Arts Initiatives, Inc., Churchill Square Postal Outlet, PO Box 23232, St. John's, Newfoundland, Canada, A1B 4J9.

Our Sound Symposium commentator Tom Nunn has been a frequent contributor to EMI. He designs, builds and performs with various instruments of his own, including his ever-evolving electro-acoustic percussion board series.

VIDEO REVIEWS

By Daniel Ray

WEST AFRICAN DJEMBE DRUMMING WITH PAULO MATTIOLI
Instructional video

This is the best instructional hand drum video I've seen. It's got everything you could want in an instructional tape! Clear, articulate teaching, good production value, a wealth of information and, most of all, the ability to be viewed repeatedly. The director should really be commended here because what he lacked in production funds he made up with skillful filmmaking. The editing is especially good. Our instructor, Paulo Mattioli, who has performed with Sting, Les Ballets Africains and Vinx, is a pleasure to learn from with his easy going personality and positive attitude. This is the main reason that West African Djembe Drumming is so enjoyable – it's not just about technique, its also about good listening skills, the spiritual connection between player and drum and living a percussion lifestyle. The video is very well organized with Paulo teaching everything you need to know about how to play the djembe. He begins by demonstrating proper hand stroke techniques to show how to make the djembe really "sing," and then moves into skills for developing a fluid style and good rhythmic sensibility. Paulo then illustrates seven basic West African rhythms: Lamba, Doundounba, Lindjian, Sedeba, Aconcon, Koukou and Mandjiani. The camera angles are well thought out and offer a clear view of what Paulo is playing. He then teaches the other polyrhythmic counterparts that go along with each basic rhythm. These include not only other drum parts, but also accompanying parts for shekere, bells, Sanba and Djun Djun. This is done in an ensemble setting with such great energy that I just wanted to grab my drum and start playing along, which is exactly the intention. The video utilizes live footage from Paulo's *Drum's of Fire* troupe to segue from one segment to another. This adds the perfect amount of flavor to the instruction without going overboard. If you are looking to learn how to play the Djembe, this video is worth every penny.

PACIFIC 3 -2 -1 - 0

From Scratch in performance. Produced by Trevor Haysam Enterprise, directed by Gregor Nicholas. Winner of Croisette D'or Grand Prix 1994 at the MIDEM 3rd International Visual Music Festival.

This is an anti-nuclear protest film by the New Zealand performance group *From Scratch*. It opens with a message stating that the United States and France have dropped 10,000 times the amount of tonnage that was used to destroy Hiroshima in the South Pacific region since that infamous day in 1945. The film then embarks on a collage of performance vignettes from the group's live performance. Bouncing from a spoken word call-and-response/scat song to a spooky segment which features sounds from didjeridoo-like tubes the film, is very fluid despite the divergent musical styles. The most provocative, especially for *EMI* readers, are the segments featuring From Scratch's large custom-built instruments made from industrial plastics and found metal. These monster PVC tube Slap-A-Phones have been seen in one form or another in earlier issues of *EMI*. The filmmaking is extraordinary! Director, Gregor Nicholas, blends gorgeous lighting, sweeping camera moves and punchy editing to give this work a surreal, dreamlike quality. This may be the films only "flaw," as the quality of the direction sometimes overwhelms the musical performance.

SOUND STORIES #1: A Video of 14 of the foremost experimental musical instrument makers in the United States.

Created by Phil Dadson. Available from P.O. Box 66060, Beachhaven, Auckland, New Zealand.

Phil Dadson, a New Zealander, created this documentary video on his trip to the United States in 1990. Phil traveled with a minimum of equipment, and this is reflected in the video's minimal approach and sometimes poor production value. Yet the concept couldn't be more provocative to readers of EMI. The video genre is perfect for showcasing musical instrument builders and their work because not only do we get to learn about innovative devices, but we get to see and hear them as well. The video's format is basic. Phil asks each inventor to describe his or her most memorable sonic adventure and then to show off their creation. The quality of the 14 different segments runs the gamut from very good to poor. Several of the segments are too short and the audience really doesn't come away with anything substantial. An example is the piece on Joel Chadabe where we view him playing his fascinating computer pad instrument. Nothing, however, about the instrument's development is revealed. As a whole, the video works well as an educational video to stimulate students into devising their own creations, but it will leave many enthusiasts of experimental musical instruments hungry for more information.

One of the things I found interesting about the video is how many of the experimental musical instruments were alike. Here we have 14 of the best instrument makers who are essentially in their own little world and many of them are surprisingly on the same inventive wavelength. Ivor Darreg, William Eaton, Skip La Plante, Dan Senn and Tony Pizzo all created variations on the guitar. William Eaton's combination Harp/Guitar was absolutely stunning. Not only was the instrument lovely sounding, but it was exquisitely crafted. Ivor Darreg invented a long string instrument that utilized home-made pickups. He played the instrument by banging and sliding a chrome pipe on the strings. This is extremely similar to an instrument that Grateful Dead percussionist Mickey Hart uses in concert during a free form improvisational segment known as "space." Hart's Beam, as he calls it, consists of several piano strings strung over an 8 foot girder with large industrial pickups.

In conclusion, I found the concept and subject matter of this documentary to be very strong, but the inconsistent production value was a drawback.

Sound artists appearing in Phil Dadson's **Sound Stories**: Skip LaPlante, Ivor Darreg, Lou Harrison & Bill Colvig, Susan Rawcliffe, Dean Drummond, Bart Hopkin, Tony Pizzo, Dan Senn, Joel Chadabe, Tom Nunn, Richard Waters, Darrell De Vore, William Eaton.

MUSIC ANIMATION MACHINE: FIRST DEMONSTRATION REEL

Video demonstration of Stephen Malinowski's Music Animation Machine, with Viewer's Guide booklet. Available from Stephen Malinowski, PO Box 13622, Berkeley, CA 94712.

Fascinating! Picture a video version of the cylinder with all the little bumps that pluck the tuned tongues in a music box and you have a visual concept of what the Music Animation Machine can do. The M.A.M., demonstrated in this video, is a computer hardware and software set-up designed to convert music, in the form of MIDI input, into real-time visual patterns on a screen. It was created mainly for developing a new musical notation system that could be understood by any individual without prior knowledge of how to read music. The concept is described in the Viewer's Guide that accompanies the video: "In place of conventional music notation, the Music Animation Machine uses a bar-graph notation in which each note is represented by a colored horizontal bar. In this notation, the vertical and horizontal placement and the horizontal length of each bar indicate the pitch, timing and duration of the note that bar represents. In addition, color identifies what instrument is playing the note or, in solo pieces, may indicate the dynamic level of the note. This bar-graph score scrolls across the screen as the music plays; the present is always at the center of the screen. As further clarification, each bar becomes brighter when its corresponding note is sounding." The guide states that this scrolling system has many advantages over conventional scoring, such as, its single staff is easy to follow, future and past events are shown, irregular timings of notes are shown instead of idealized and the notation is practically free from symbols whose meanings must be interpreted. All of this is absolutely intriguing, of course, but the real stimulation comes from the potential that the individual viewer can foresee from this device. In fact, after viewing this extraordinary video my mind was swarming with ideas on how to utilize this technology. "What would a rock song look like? I wonder if I could write music with this? This would be great for kids, etc." For this reason, the M.A.M. video really stays with the viewer. All the songs illustrated by the M.A.M. are solo piano pieces. Hopefully, Mr. Malinowski will put out a demonstration reel with all types of music. I can't wait.

SOUNDS (LIKE INDIA)

Created by Bill and Mary Buchen. Available from Sonic Architecture at PO Box 20873, Tompkins Square Station, New York, NY 10009.

This is a great amateur video movie. Bill and Mary Buchen document their trip to India by painting sonic sketches of Indian life. Utilizing their Hi8 camera, they show us women washing clothes by beating the sopping garments on stone steps that lead into a small city river. A day in the life of a city cow (regarded as sacred in India) is documented humorously as we watch, from the cow's point of view, pedestrians, bicyclists, buses, cars and motorbikes maneuver around the animal in the middle of a busy street. Next we are off to listen to the constant high-pitched clacking of talented sculptors chipping away at a block of stone to create a religious statue. And so on. The videomaking is definitely amateurish (a tripod would have made things easier on the viewer), the segments are a little longwinded and the editing is lethargic, but the concept is great for any audiophile who would like to "hear" India. I would have liked to watch/listen to more.

Videos for review may be sent directly to reviewer Daniel Ray at PO Box 5090, Avon, CO 81620, USA, or to EMI at PO Box 784, Nicasio CA 94946, USA.

SOUNDCULTURE 96

In April 1996, San Francisco will host **SoundCulture 96**, the third transpacific festival of contemporary sound practices. It follows two highly successful SoundCulture events presented in Sydney in 1991 and Tokyo in 1993. Participants will include artists, researchers, cultural theorists, presenting organizations, academic institutions, and others working with sound. Events will include performances, exhibitions, symposia, radio transmissions, experimental and indigenous musics, site-specific public artworks, and new media arts. As well, listening rooms will provide an opportunity to hear a wide variety of recorded sound works in an informal setting. **SoundCulture 96** will bring together local and international sound practitioners who reside in the Pacific Region to explore the diversity of culture that is perceived through our ears.

General Deadline: Friday, March 31, 1995

Deadline for Listening Room Submissions Only: **Friday, December 1, 1995**

For information and application form contact:

SoundCulture 96
Walter McBean Gallery, San Francisco Art Institute
800 Chestnut Street, San Francisco, CA 94133 USA

Telephone: (415) 749-4550
Fax: (415) 749-4590
Email address: sc96@kumr.lns.com
On the World Wide Web: http://www.lns.com/sc96.html

RECORDINGS REVIEWS

By Sasha Bogdanowitsch, Mitchell Clark, Bart Hopkin, Tom Nunn and René van Peer

ANTHOLOGY OF BRASS BAND MUSIC #1 - FROZEN BRASS ASIA (PAN 2020CD)

ANTHOLOGY OF BRASS BAND MUSIC #2 - FROZEN BRASS AFRICA & LATIN AMERICA (PAN 2026CD)

Both on CD from Pan Records, distributed by Arhoolie

Compiled by the Dutch anthropologist and musician Rob Boonzajer Flaes, these CDs are the result of research into a cultural spin-off of Western colonization: the dissemination of brass bands (paragon of military power) and their repertoire, both altered to varying extent according to taste and needs of the indigenous peoples. One variety, described by Boonzajer in *EMI* vol. IX #4, is the 'brass' as played in Minahassa, the northern tip of the Indonesian island Sulawesi. In mellifluous tones bamboo *kornos* and zinc approximations of brass instruments play hymns, Dutch folk tunes and dance-hall music in serious manner and at a solemn pace, stretching the meter so far as to render dance-types and melodies just barely recognizable.

Other wonders of this collection include a *tanjidor* orchestra from West Java that plays *gamelan* pieces, the trombone imitating the *gong-ageng* close to perfection – vibrations and all; a Philippine band in which the instruments are made from plaited bamboo stalks, sound production is a kazoo-type mouthpiece; there is a beautiful variety of marching bands from Bolivia and Peru, some of them using flutes and panpipes instead of brass – especially a Bolivian *morenada* is a brilliant and dazzling piece performed with breathtaking bravado; there is uplifting dance music from a *winti* celebrational festival in Surinam, fired by shouts of exaltation. Speaking of which, in many of the Latin-American pieces people add another unusual type of instrument to the hubbub manifesting irrepressible cheer: all manner of firearms. The human being is a peculiar animal indeed.

—RvP

CARNIVAL DE CARNITAS - LEE PEMBLETON AND BRIDGETTE WILSON: **PEYOTE AND HAPPY**

On cassette from Lee Pembleton, 1808 N. Damen, Chicago, IL 60647

With a Skil 3/8" 6225 VSR drill, bass guitar, miscellaneous metal and absent any electronic effects or overdubbing, the duo Carnival de Carnitas offers a music of industrial/mechanical noise textures. As with much continuous, texturally based music, *Peyote and Happy* focuses the listener's attention on the details within a mass of sound – it is at once simple and complex. The sound mass usually consists of multiple "voices," each distinct but continuous and free of any overall rhythmic pulse. The plethora of underlying rhythms and pulsations, however, provide a constellation of periodicities that is sonically rich.

An extended opening section suggests little change – maybe the whole tape is this? But a nice transition moves the music to another, less dense, somewhat more interactive character. Thereafter, transitions are subtle and gradual, a kind of slow panorama of the soundscape.

Considering there was no use of electronic processing or overdubbing, these textures are quite astonishing (also assuming only two people were playing)! As with many such recordings, I'd like to hear and see a live performance; I'm sure the theater of it all would be a source of entertainment in itself.

Little information was provided about this recording – only some photocopied advertisement sheets and a small strip of paper with information was provided to this reviewer. So some guesswork is called for to determine what techniques might have been used to produce these sounds. "Misc. metal," of course, covers a broad range of possibilities. The drill can be heard, but only barely identifiable; perhaps bows were used; scraping metal was definitely one of the techniques; bass guitar is also barely identifiable. The sounds are mixed and matched quite well – an "industrial consort" sound that stays interesting for a good length of time. Dynamics vary only slightly throughout as does *density* of the texture in keeping with the minimalist aesthetic.

Note: there are occasional rough spots in the recording, but this only adds to the eccentricity of the expression, as does the photocopied photo of a couple (Pembleton and Wilson?) standing out on their porch barbecuing... carnitas, no doubt!

Cassettes face a challenge that CD's don't – two sides. This division of the overall album brings up the issue, especially in textural music such as this, will the second side be something different or a continuation? Since the two sides of this cassette are separately titled – "Peyote" and "Happy" – one would expect perhaps a different piece. Unhappily, "Happy" is not. On a CD, with a single title, it could work, though it's a lot of texture for a long time. I would like to have heard maybe a different instrumentation on side B, or a different use of texture, perhaps less dense or more "strung-out" somehow. As it is, "Happy" sounds like a continuation of "Peyote," though subtly new sounds and textures, equally rich, do appear. However, I could not sustain interest for the entire second side, as it seemed to be more of the same.

—TN

COYOTE OLDMAN: **COMPASSION**

On CD from Coyote Oldman Music, P.O. Box 508, Berryville, Arkansas, 72616

Coyote Oldman is a world flute and sound manipulation duo from Oklahoma specializing in the playing and reconstruction of Lakota flutes and Incan panpipes. Their previous five releases have drawn from these textures exclusively, but the current release adds new instrumentation as well as the gorgeous voice of Hui Cheng, female vocalist from China's National Opera. All of the instruments on this release, excluding the pre-Columbian clay flute and the traditional South American kena, were constructed by Michael Graham Allen. New additions to his family of plains and medicine flutes include experimental bass flutes and double flutes which (in Michael's words) are "nontraditional extensions of the ancient Plains flute (and) to my knowledge, unique in the world." These flutes provide an awesome bottom-end extension to the usual high register flute compositions of previous recordings.

The other member, Barry Stramp, is player and sound man extraordinaire, contributing soft and gentle playing and the essential studio engineering and sound manipulation via the latest technology from Eventide and Lexicon.

The compositions are similar to their earlier recordings, and only two pieces on the disc venture from the minor pentatonic modes that they usually perform in. All the pieces have a floaty, airy quality and seem to settle in harmonic progressions in fifths, fourths, and octaves, sometimes unified by slow ostinatos settled in a single tetrachord – a Native American organum, if you will, in the cathedral halls of modern reverb machines. But this is not bad; it issues forth beautiful music on visually splendid instruments that yearn as their players do to be compassionate.

—SB

IVOR DARREG: **DETWELVULATE!**

On CD. No record company credited. Available from the Ivor Darreg Memorial Fund, PO Box 371443, San Diego, CA 92137-1443.

Ivor Darreg, a signal figure in recent intonational exploration and instrument design, died early last year (1994) at 76 years of age. Ivor was always a musical independent; certainly never part of any institutional power structure, and keenly aware of his outsider status. Yet, he rattled his cage with sufficient ferocity to make a great many people aware of ideas. And ideas is what he was about: He had ideas on a great range of subjects, and he had an intense need to communicate them.

When he died, a number of those who had been influenced by his thinking gathered to discuss how to commemorate his life and ensure that his works remain available. Among the projects they planned was the posthumous CD being reviewed here. Several people had a hand in production of the CD, most notably: Brian McLaren, who did most of the actual sound work in preparing the master tapes (more on that in a moment); Gary Morrison, who did much of the work in preparing the package, including wonderful design work for the cover and booklet; and Jonathan and Elizabeth Glasier of the Interval Foundation in San Diego, who provided organizational support (not to mention having been Ivor's greatest facilitators on a day-to-day basis in his later years).

In the years before his death, Ivor was constantly producing and sending out cassette tapes. We received them here at *EMI* on a regular basis. These tapes were roughly made. Operating with limited resources, Ivor recorded on poor quality equipment, and transferred the recordings to poor quality cassette tapes. His performances on various instruments were often unpolished. His megalyra instruments, for instance, have a truly grand and massive sound. But Ivor's megalyra recordings contained large doses of noise and general clunkiness, coupled with sloppy rhythmic articulation – even as the grandeur of the instrument, the tunings, the underlying intent came clearly through.

I always thought of this unpolished quality as a healthy part of the *gestalt* of Ivor Darreg's music, and this is the frame of mind I brought to the new *Detwelvulate* CD. But, people, I got a surprise, and I had to realign my thinking as a result.

All but a couple of pieces on the CD were recorded with Ivor performing on digital keyboards. The rough and noisy acoustic instrument sounds, as a result, are gone; the sound is perfectly clean. Most of the pieces were stored as MIDI files taken directly from Ivor's real-time keyboard performances, to be edited and orchestrated later using computer and synthesizer.

The editing, orchestrating and digital mastering were performed by Brian McLaren. The liner notes for the CD scarcely mention his role, but in fact McLaren's work is central to this CD. The key word is "orchestrated:" From the palette of synthesized sounds available to him, Brian made decisions regarding what timbre the instrumental voices in each of the performances would have. Thus, some pieces are realized as if played by a string orchestra, others as if by flutes, pan pipes or brass in various combinations; one is set as a vibraphone solo, another for Tibetan bowls, and so forth. In addition, Ivor's playing here seems cleaner and more precise than it does in the earlier cassettes; whether that reflects post-performance editing work or the very different effect of the digitally clean sounds, I don't know.

One could ask a couple of questions here. First, do the orchestrations work musically? Second, is it appropriate to present Ivor Darreg's music in this way?

Well, it's all a matter of opinion. Here's mine: There are those who are offended by the very notion of imitative synthesis. I strongly agree that sounds synthesized in imitation of existing instruments are a lot less interesting than the instruments they imitate, and, OK, a lot less soulful than natural acoustic sounds. But what works works. As for the present case, these orchestrations seem to let the composer's ideas come across with lucidity. And they do make good, enjoyable listening. Will Ivor spin in his grave at this treatment of his work? This question I think we can answer with some confidence. Ivor never spurned the idea of electronic imitative sound (after all, one of his early instruments was the electronic keyboard oboe). He welcomed technological advances that diminish the obstacles to the realization of music. He was always in favor of practical solutions and had no tolerance for doctrinaire purists. Regardless of circumstances, he loved to see his music performed and heard by as many people as possible. He will not spin.

The rough and ready spirit of much of Ivor Darreg's output is missing. In its place, this CD does bring new light into his music, allowing the listener to hear a great deal that might not have surfaced otherwise. The special tunings, too, come across attractively and clearly.

I should mention one other facet of this CD. There are seventeen different equal temperaments represented in the pieces here, ranging from 9 tones per octave to 53. The tunings of the pieces are all clearly marked on the disk itself and in the liner notes, so you can always know what tuning system you are hearing as the disk progresses. These aren't commonplace tunings; there aren't many other places you can go to hear and study them. In fact, this is probably the only place you'll find most of them if you don't want to do an awful lot of programming or building yourself. So – let them be heard.

—BH

David Dunn: **ANGELS AND INSECTS**

What Next? Recordings, c/o Nonsequitur Foundation P.O. Box 2638, Santa Fe, NM 87504

This wonderfully recorded CD, with equally wonderful liner note insights, consists of two long pieces, "Tabula Angelorum Bonorum 49" and "Chaos & the Emergent Mind of the Pond."

"Tabula Angelorum" is a pleasing ebb and flow of rich, yet relatively simple, electronic textures that have a subtle feeling of phrase, while some of the sounds are almost motoric in their various electronic periodicities (sometimes very square-wave sounding). Actually, this music initially reminded me of insect sounds, so for a while I thought I was listening to the other piece. The reason for the title, "Tabula Angelorum," is quite interesting as explained in the liner notes.

The music is derived via computer from seven different voices, each speaking the names of seven different "good angels." The names of the 49 angels are taken from a work by John Dee (1527-1608) of the same title. Dee, considered in his day "the most learned man in Europe," collaborated with seer Edward Kelly to investigate communication with angels. Dunn's 4-page insert briefly introduces Dee and Kelly's work and describes how the phonemes of these spoken names formed the basis of the composition. "I ... employed a computer using time expansion algorithms to expand the time domain for certain phonemes commensurate with the original structural analysis." Though minimalist in character, this music maintains interest in its richness and almost hypnotic quality.

"Chaos & the Emergent Mind of the Pond" presents a nice contrast to the first piece while at the same time continuing the contemplative mood. The acoustic quality of the aquatic insect recordings is immediately different, and the phrasing – or sense of ebb and flow – is slower than that heard in the electronic piece. While the angels are *enunciated* individually, the insects express a community – multiple layers of "goings on." Dunn comments, "Perhaps the complexity of these tiny rhythmic entrainments and chaotic cycles of microcosmic heart beats hover around that basin

of attraction known as thought and together bring into being an awareness which I cannot fathom."

Angels and Insects is a CD that can be treasured by those listeners who desire to find that pre-conscious space of empathy with sound that delights in its subtleties and rich but subdued texture. I enjoyed it a lot, and it's not at all like the music I make; that's a recommendation.

—TN

ILES SALOMON MUSIQUE DE GUADALCANAL

OCORA C 580049. On CD, distributed by Harmonia Mundi

The panpipes from the Solomon Islands are fairly well-known. They are featured on different CDs: *Ensembles de flûtes de Pan 'aré'aré* and *Polyphonies des Iles Salomon Guadalcanal et Savo* (both from Harmonia Mundi), to name a few. This particular recording, however, has a stirring surprise in store: an aeolian organ. The ultimate wind instrument, it consists of bamboo poles erected on a beach. The notes by ethnomusicologist Hugo Zemp, who made the recordings, speak for themselves.

> The instrument we recorded consists of four bamboo canes (*ghau*) about 15 to 18 feet in length. After stripping off the foliage the men cut an opening in the internodes of the upper part of the canes. These "mouthpieces," into which the wind blows, can take two different shapes: one is a roughly square or oval hole, the other a lengthwise slit. Both the diameter of the canes and the length of the internodes decrease towards the tip, as does the dimension of the man-made mouthpieces. As a result, each cavity has a different volume and, in theory at least, produces a distinct sound. In practice, each cavity does not give one precise sound, but a multitude of harmonics, some of which emerge more clearly than others, depending on the force of the wind. A real storm is needed for the Aeolian organ to be heard properly. The *ghau kilori* used to be built for one particular event: the committing of a body to the sea. The sound of the Aeolian organ was thought to call the spirit of the dead man back to his village before it went to dwell in the island of Malapa.'
>
> 'The Aeolian organ, which was associated with a funeral rite no longer in practice, had not been set up on the beach for many years. The villagers of Makile installed one especially for us, so that its sound could be heard.'

A footnote reference directs the reader to an article by Zemp (in French, unfortunately): "Un Orgue éolien de Guadalcanal," *Objets et Mondes, La Revue du Musée de l'Homme,* XI-2, Paris, 1971.

The sound, as one can imagine, is haunting and moving; pretty well suited, I'd think, to call up any spirit, however reluctant or obstinate it may be.

—RvP

WILL MENTER AND ENSEMBLE: **CAN Y GRAIG — SLATE VOICES**

Resonance RESCAS 100 (1991). Available on cassette and DAT from Resonance, Watercatch, Backwell Hill, Bristol BS 19 3EH, England.

SIWSANN GEORGE AND ENSEMBLE: **TRADITIONAL SONGS OF WALES — CANEUON TRADDODIADOL CYMRU**

Saydisc CD-SDL 406 (1994). Available on CD in record stores as well as from Qualiton Imports, 24-02 40th Ave., Long Island City, NY 11101. Both albums include texts in Welsh and English.

For a number of years, Will Menter has been incorporating his own unusual musical instruments into his work as a composer and performer. Since 1986, when he worked as instrument maker in residence at the Welsh Slate Museum, he has been building and performing on mallet-percussion instruments with bars made of slate. He calls his instruments *llechiphone*, from *llechi*, the Welsh word for slate.

Will Menter's *Can Y Graig — Slate Voices* is a collaboration with the Welsh poet Gwyn Thomas and is composed for llechiphones together with soprano saxophone, trombone, and the voice of Sianed Jones, who also plays violin and bass viol. *Can Y Graig* is a song cycle, the texts on the subjects of slate, its quarrying, and life in the quarries. The music shows Menter's experiences in jazz, traditional African musics, and the repetitive structures of recent British systems music.

With the focus, textually and materially, of *Can Y Graig* being the story and substance of slate, the disappointment is that the llechiphones don't offer a timbre or sonic quality that is at all much different from a mallet instrument made with hardwood, such as a marimba. The Latin style of a couple of the sections of *Can Y Graig* underscores this marimba-like quality.

Singer Siwsann George's *Traditional Songs of Wales — Caneuon Traddodiadol Cymru* includes a traditional Welsh musical use of slate, *clocsio ar lechen* (clogging on slate), performed by Catrin Defis, as one of the accompanying instruments for the song "Yr Insiwrans Agent" ("The Insurance Agent"). As shown in a photograph in the booklet, the clogger dances on a disc of slate about two feet in diameter. Variations in relative pitch are discernible in the *clocsio ar lechen*. Among other traditional instruments used on this album are *hyrdi-gyrdi* (hurdy gurdy), *telyn geltaidd* (Celtic harp), and the *crwth*, a bowed lyre, essentially the national musical instrument of Wales. But the center of the musical texture on this album is Siwsann George's voice. The strength and firmness of her singing, at one with the guttural feel of the Welsh language and the modal cast of the songs, gives the music a solidity which has a truer ring than the llechiphones of Will Menter's work.

—MC

ELDON RATHBURN: **MOSTLY RAILROAD MUSIC**

Crystal Records CD520 (1994). On CD from Crystal Records, 28818 NE Hancock, Camas, WA 98607

Canadian composer Eldon Rathburn was a staff composer for the National Film Board of Canada from 1947 to 1976, where he wrote a great many scores for NFB releases. (To name one classic, Buster Keaton's last film, *The Railrodder*, made when the great stone face's own country's film industry had essentially forgotten him.) *Mostly Railroad Music* contains compositions of Rathburn's drawn from his film work as well as concert pieces, recorded during the period of 1980-1993. Some of these pieces include such instruments as steam calliope and jew's harp, alone and in combination with other instruments. John Cage once said that he came to work with dancers on such a regular basis because they — more than "serious" musicians — found his work "useful." Obviously a whole generation or more of Canadian film-makers has found Eldon Rathburn's music eminently useful.

With the coming of the industrial age, the most popular programmatic theme in Western music became, it seems, the railroad train. (Rathburn, who wrote his own program notes, cites C.V. Alkan's piano piece *Le Chemin de Fer*, 1827, as the earliest piece with a train theme.) Anyone who loves trains knows their attraction — and the sadness of their (both literal and figurative) passing. Eldon Rathburn's handling of this theme is something he's been crafting for years. A sense of nostalgia itself could fuel the engine of this album, but the music is great. Rathburn has a playful wit and a penchant for creative fantasy, and a number of pieces play upon musical themes and historical anecdotes of composers of the past. For instance, Rathburn asks, what was up in Dvorak's mind as he watched trains go by at 155th Street in New York City during his stay there? or what would the musical results of a "Schönberg vs. Gershwin" contest have been? Rathburn gets dense, diverse, and vivid textures from small ensembles, such as the one he uses in his marvelous *The Rise and Fall of the Steam*

Railroad, for instance, which is for plectra and percussion together with harmonica, jew's harp, calliope, and an inventively used synthesizer. While his pieces are – ostensibly, at least – in equal temperament, the jew's harps (multi-tracked) of *Junction* and the calliope of *Three Calliope Pieces* (with its marvelous pastiche, *Stravinsky on the Delta Queen*) bend and twist this standard in a rough and ready, non-theoretical way.

This release also includes Rathburn's researched bibliography of train pieces from the repertoire, listing a dozen or more candidates for further listening (with a few airplane pieces as well). Rathburn's own compositions – including pieces such as *The Iron Horses of Delson* and the *Six Railroad Preludes* – significantly augment this list.

—MC

UAKTI: **I CHING**

On CD from Twenty-First Century Culture, 165 West 57th St., New York, NY, 10019.

Appearing for their second time on Philip Glass' Point Music label, Uakti brings new and vibrant instrumental splendor to their new release, *I Ching*. Uakti is a Brazilian quartet that focuses on original compositions played on (for the most part) original instruments. It consists of percussionists Paulo Sergio dos Santos and Decio de Souza Ramos Filho, woodwinds player and composer Artur Andres Ribeiro, and composer and string player, Marco Antonio Guimaraes.

Marco is the maker for all of Uakti's instruments, ranging from glass marimbas and PVC percussion to gourd fiddles and mirliton flutes. The only unfortunate thing about the CD is that there is the lack of pictures and physical description for the marvelous instruments that grace this recording. In listening to the CD and envisioning its sound source, I found that I could guess a didjeridu or conduit trumpet or even some bowed glass, but what about instruments with seemingly a dozen, drony strings that sound like an enormous hurdy gurdy or some bizarrely tuned double reed instrument?

More importantly, it is Marco's compositions, commissioned for the Grupo Corpo Brazilian Dance Theater, that take up the majority of the disc and demand the most attention. Following John Cage, Marco turns to the I-Ching to help generate compositional form and pattern. The classic Chinese book, used to divine the future, serves as the main moving compositional force for Marco's two extensive pieces, *Trigrams Dance* and *Hexagram Dance*. Interpreting the I-Ching's yang and yin lines as quarter notes and eighth notes respectively, the *Trigrams Dance* corresponds to eight of the trigrams' symbols, images, and functions. The opening piece, 'Heaven', is the most effective, using strings, didjeridu, and horns in a bouncing triple meter, resounding the harmonic series in pitch and rhythm. Other pieces, like 'Earth' and 'Mountain,' fall into typical Uakti ruts with Bach-like polyphonic progressions in the glass marimba combined with jazzy flute licks atop, but still these contrast quite well with the polyrhythmic power of pieces like 'Thunder' and 'Fire'. The *Hexagram Dance* is a musical reading of 64 of the hexagrams set in a hierarchical chart, and produces a piece that weaves through a variety of textures, involving playing a very large array of Uakti's instruments.

The other two compositions on the disc are by the wind player Artur Riberio. His pieces, 'Alnitak' and 'Turning Point,' are tuneful, diatonic works featuring the flute (is that a traditional silver one or is it made by Marco?) and the Uakti signature sound, the glass marimba.

Compared to the last two releases, *Uakti* and *Mapa, I-Ching* stands out by taking the listener a step higher into their rich and complex sonic world. By remaining true to their acoustic sound and eliminating their previous use of synthesizer, Uakti has been able to expand their quality of sound, letting it focus, as it should, on their highly original instruments.

—SB

ROGER WINFIELD: **WINDSONGS**

On CD from Saydisc Records, Chipping Manor, The Chipping, Wotton-UnderEdge, Glos. GL127AD, England.

Critics might classify this recording as another example of new age music played on experimental instruments. Though this might be true, what can one say when the chief contributor towards composition in this recording is the wind? Yes, the music is soothing at times, but most of it evokes a dark, ominous quality somewhat akin to a marvelous storm brewing.

The artist here is English composer and designer, Roger Winfield. Using an orchestra of eight different aeolian harps made from wood, perspex, fiberglass and metal, Roger uses magnetic pick-ups to record the sounds of the wind on the various gauges of metal strings that reside on the instruments.

Windsongs is a product of a four-month recording trip to Bristol, England, and the La Manza and Sierra Nevada area in Spain. There Roger experienced an outpouring of weather challenges and a variety of venues, such as a balcony on a deserted tower block on the Mediterranean, or the foothills of snowcapped mountains in Andalusia.

Unlike other recordings in which aeolian harp is recorded direct to tape without human intervention, Roger spends hours in the studio editing and multitracking various aeolian harp recordings to best suit his compositional needs. And it does work quite beautifully, as one can see in the cut 'North Wind', taken from a suite of four directional winds. The sounds in this piece transform from a gentle sea to a sky of distant horns to the simple, single harmonic melodies on one lonely string.

Unfortunately, the makers of the harps are not acknowledged, nor is there sufficient information and pictures on these vessels that transmit the wind's motions into music.

—SB

NOTICES

SPIRIT TALK MBIRA: Traditional Musical Instruments from Zimbabwe. An exhibition celebrating the work of contemporary mbira makers and a presentation of photography by Zimbabwean artist, Chicago Dzviti. February 2-March 5 at the Barn Gallery, Middle Tennessee State University, Murfreesboro, TN 37132. Opening events planned for Feb. 2 and 3. For information call (615) 898-2455. [10-3]

Special Session on Acoustic Ecology at the meeting of the Acoustical Society of America, Ramada Techworld, Washington, DC, May 31-June 4, 1995. Presented by the World Forum for Acoustic Ecology and the Acoustical Society of America. For information contact Fred Lipsett, 37 Oriole Drive, Goucester, Ont., K1J 7E8, Canada; phone (613) 746-3507. [10-3]

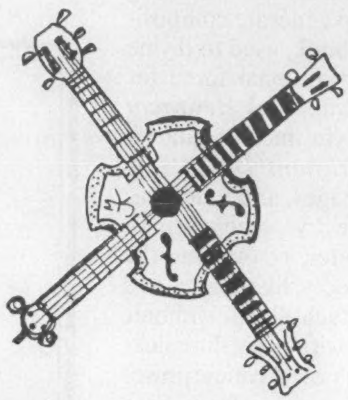
Job Opening: Administrative Director. Frog Peak Music and the American Gamelan Institute are looking for an arts administrator to help run two small, independent publishing collectives. Responsibilities include artist relations, publicity, design, publishing projects, administrative tasks and financial management. Contact Larry Polansky/Jody Diamond, (603) 448-8837. [10-3]

INCANTORS – Q.R. Ghazala has recently bought out another small inventory of brand new and increasingly rare Texas Instrument Speak & Maths. These devices are the heart of the most deluxe and best sounding INCANTORS to date. Price is $240 (reflecting only parts plus bench fee at repair shop hourly rates). Finished instruments are flourescent green and gold. Controls include looping, speed/pitch dial, milk glass and brass electric eye (sequences loops with a wave of the hand), body-contacts for inter-flesh modulation, envelope LED, three voice-bending switches and reset switch. All INCANTORS include blue flourescent alpha-numeric display, monitor speaker, line output, custom patch cord, and instruction sheet. Amazement guaranteed. Owners consider the INCANTOR to be the ultimate experimental music box. For more information, see the INCANTORS article in EMI Vol VIII #6, June 1993, or write to Reed at Sound Theater, Echo 241, 7672 Montogmery Road, Cincinatti OH 45236, USA. [10-3]

Sounds of Ethnic Musical Instruments by Telephone / Information on Traditional Music by fax. Anyone with a phone can hear the sounds of instruments from around the world. Call just to listen or to shop by sound for an instrument that you are insterested in. Receive free information by fax about taking care of various musical instruments, interviews with musicians, instrument tunings, items that Lark offers, and other interesting articles. Available 24 hrs a day: LarkInfo (707)964-3762, from Lark in the Morning, (707)964-5569. [10-3]

WHEN THE EARTH WAS LIKE NEW: Songs & Stories of the Western Apache, a book and tape set by Chesley Goseyun Wilson, Ruth Longcor-Harnisch Wilson and Bryan Burton, is soon to be available. Included, along with a wealth of other cultural information, are recordings of and instructions for making the Apache violin. Available from Chesley & Ruth Wilson, 333 S. Alvernon Cnd 60, Tucson AZ 85711. [10-2]

VIM #4 is now available, after seven long years. VIM is the original journal devoted to Jew's Harp. You can also order the soon-to-appear VIM #5 at this time. VIM #4 and 5 are $6 each from Frederick Crane, 601 N. White St., Mt. Pleasant, IA 52641, USA. A few copies of earlier issues remain available, and Prof. Crane also has some high quality instruments from Siberian makers for sale -- write for details. [10-2]



ANYONE CAN WHISTLE is a catalogue of musical discovery, featuring great gift ideas for every age and pocketbook -- music boxes, wind chimes, drums, toys and hundreds of musical instruments from the mundane to the obscure. Call for a catalogue and request our free sampler compact disc featuring music from an array of unusual instruments, plus performer interviews. Or visit our retail store at 323 Wall St. in uptown Kingston, NY. Anyone Can Whistle, PO Box 4407, Kingston NY 12401; tel. 800-435-8863, fax 914-331-4475. [10-2]

Remember SONIC ARTS GALLERY, home of a permanent collection of sound sculptures, venue for concerts, lectures and sound-arts demonstrations? It has re-opened at a new location: 2961 Beech St., San Diego CA 92102; phone (619) 231-3673. [10-2]

INTERNATIONAL SYMPOSIUM ON MUSICAL ACOUSTICS '95 will take place at Dourdon (Paris area), July 2-6, 1995. Main themes: New instruments & new sounds; scientific research with application to instrument making. For information: ISMA '95 Secretariat, c/o Rene Causse, IRCAM, 1 Place Igor Stravinsky, 75004 Paris, France; tel. (33 1) 44 78 47 60; fax (33 1) 42 77 29 47; email: isma@ircam.fr. [10-2]

After a 3-year break, the student-run radio station WRUB at SUNY Buffalo is going back on the air. Programmers are seeking recordings of new and unusual music (WRUB is the only station programming new music in the Buffalo area). If you have a new music label, they'd like to hear from you. Write Charlotte Pressler at WRUB, University at Buffalo, State University of New York, 174 MFAC, Amherst, NY 14261. [10-2]

ELSEWHERES: The electroacoustic music of Hal Rammel. A CD of new recordings on the electroacoustic sound palette, designed and built by Hal Rammel. Contact Penumbra Music, PO Box 282, Grafton WI 53204 USA. [10-2]

VOICE OF EYE / VESPERS. New CD includes handmade and indigenous instruments filtered through transparent electronics. Suggested for late night trance journeys on the ship of dreams. $12 ppd from Cyclotron Industries, PO Box 66291, Houston, TX 77266. [10-1]

THEREMINS are still manufactured by and available from Robert Moog's BIG BRIAR, Inc. Rt. 3 Box 115A, Leicester, NC 28748. [10-1]

NEW stacked lamination segment drum shells, custom built to order, any wood, reasonably priced. Retail/wholesale. Call for free brochure. (413) 532-3982. [10-1/10-3]

AIR COLUMNS AND TONEHOLES: PRINCIPLES OF WIND INSTRUMENT DESIGN is a spiralbound booklet containing the four articles on practical wind instrument acoustics by Bart Hopkin that appeared in EMI in 1992 and 1993. The articles have been much revised and improved, and there are several additional features included. Published by Tai Hei Shakuhachi; available for $12.50 (no additional postage required) from Tai Hei Shakuhachi, PO Box 294C, Willits, CA 95490, or from EMI, Box 784, Nicasio, CA 94946. [9-4]

BIOFEEDBACK SOFTWARE/HARDWARE: WaveAccess has released WaveRider, a MS Windowsbased program with peripheral hardware that allows MIDIcompatable monitoring of biowaves. For information contact WaveAccess, PO Box 4667, Berkeley, CA 94704, (510)526-5881.[93]

EMI needs a computer person to steer us through ins & outs, pros & cons of various forms of being on-line. If you're comfortable on the Internet and know its highways and byways, consider giving us a call for what might be a single discussion or might lead to an ongoing involvement. Ask for Bart at (415) 662-2182. [10-3]

A REMINDER Unclassified ads here in EMI's notices column are free to subscribers for up to 40 words; 40¢ per word thereafter. For others they are 40¢ per word, 15 word minimum, with a 20% discount on orders of four or more insertions of the same ad.

SUBSCRIPTIONS TO EMI: $24/yr for U.S.; $27/yr for Canada & Mexico; $34/yr overseas. California residents add 7.25% sales tax for a total of $25.74. Order from EMI, Box 784, Nicasio, CA 94946, USA.

EMI BACK ISSUES: Bound volume sets Vol 1 through Vol 9, (Vol. 10 too, after Sept. 1995): $17 per volume. Each volume set contains all of the issues of one volume year, photocopied and bound under one cover. The photocopies are a step down in quality from the original press runs, but they are readable still. The price includes postage for U.S., Canada & Mexico air, and overseas surface rate. For overseas air add 20%. In California add 7.25% sales tax. Order from EMI, PO Box 784, Nicasio, CA 94946, or write for complete listing of back issues and their contents. Corresponding cassette tapes also available for later volumes; see information below.

CASSETTE TAPES FROM EMI: $8 per cassette for subscribers; $10.50 for nonsubscribers. Prices include postage for U.S., Canada, Mexico air, and overseas surface rate. In California add 7.25% sales tax. For overseas air add $20%. Each tape contains music of instruments that appeared in the newsletter during the corresponding volume year, comprising a full measure of odd, provocative, funny and beautiful music. Volumes VI, VII, VIII and 9 remain available. Earlier volumes are now sold out. Order from EMI, Box 784, Nicasio, CA 94946.

Who said it – Samuel Clemens, maybe? If the world begins to seem like such a dangerous place that maybe it'd be better to just stay in bed, consider this: More people die in beds than anywhere else.

No need for further debate; the real origin of the universe has been known to EMI types all along: The Big Twang.

created by the group ZGA. Most of these involve piezo pickups on tables, boards or other mountings which hold metal plates, springs, cans, toy instruments, and more.

Also in **Unfiled** (address above): Several articles on sampling, addressing both technology and legal/political/ethical issues.

"Plunderphonia" by Chris Cutler, in **Musicworks** 60, Fall 1994 (Music Gallery, 179 Richmond St. West, Toronto, Ontario, Canada, M5V 1V3).

More on sampling and the re-making of existing recorded music into new musical pieces, as practiced by John Oswald and prohibited by lawyers for Michael Jackson.

"Just Shape, Nothing Central" by Paul Rapaport, also in **Musicworks** 60 (address above).

The author discusses his development of a just tuning system and his composition with it, emphasizing the door-opening aspects of the process of learning about just intonation.

"Different Drummers" by James F. Quinn, in the *Tempo* section of the **Chicago Tribune** for March 24, 1994.

Review of a performance of the Jellyeye percussion troupe, which presents dance-drumming performances using all sorts of drums, found-object percussion, percussible costumes, etc.

"DXing the Planet Earth: Guide to Natural Earth Radio" by Larry Van Horn, in **Monitoring Times,** December 1992.

Following Reed Ghazala's recent article on unexplained earth sounds in *EMI*'s last issue, word comes of this earlier article on the fascinating VLF and ELF (Very Low Frequency and Extremely Low Frequency) radio signals that arise as a natural by-product of the earth's electromagnetic activity, which can be picked up on carrier frequencies below 5kHz.

"The Strat Turns 40!" (no author credited) in **Music Trades** August 1994 (PO Box 432, Englewood NJ 07631).

Some company history, some social history, and some notes on modern manufacturing, relating to Leo Fender's classic Stratocaster guitar.

Music Trades November 1994 (80 West St., PO Box 432, Englewood, NJ 07631) contains the following articles:

"Zildjian's New Quality Drive": Mostly promotional information on design and installation of new machinery for cymbal making at the Zildjian company.

"Peavey's New Drum Line": Description of an innovation in drum design, in which the shell is made quite light, while the rim is made heavier, to take the stress of the drumhead in a manner analogous to a string instrument bridge and the steel frame of a piano.

"Bow Rehairing Another Way" by Christopher Banner, in **TechniCom** Vol 19 #3, May-June 1994 (PO Box 51, Normal, IL 61761).

A how-to on violin bow rehairing, with a list of suppliers.

"In Search of the Perfect Instrument" by Katie Frohmberg, in **Music for the Love of It" (67 Parkside Drive, Berkeley CA 94705).**

Thoughts on suitable woods for oboe making, suitable materials for fabricating the keys, and other topics, from oboe maker Ken Decker.

The sporadic journal devoted to trump (Jew's harp) known as **Vierundzwanzigsteljahrsschrift der Internationalen Maultrommelvirtuosengengenossenschaft** (601 N. White St., Mt. Pleasant, IA 52641), has come out with its #4, 1994 issue containing an overview of activity for the last several years (which have been surprisingly rich, trump-wise), plus articles on a variety of trump-related topics both historical and contemporary.

Music for People (7 Middletown Road, Roxbury, NH 03431-8703), the organization devoted to self expression through music and improvisation, has assembled its **Resource Catalog 1995**, with where-to-find listings for instruments and equipment (lots of sources for interesting and unusual instruments), as well as teachers, books & periodicals, networks & institutions, etc.

"Guitar Rocks 'n' Rolls its way to Indy" by Laura Lane, in the Indiana **Herald-Times** for Oct. 20, 1994.

The story of a giant replica of a guitar (38 feet long), apparently at least somewhat playable, built by high school students at Greene County High School in 1991. It has recently been purchased by celebrity personality Dick Clark for display in a restaurant he owns.

Dandemutande 5, November 1994 (1711 East Spruce St., Seattle WA 98122-5728) has several excellent articles on the making of Zimbabwean instruments and related instruments elsewhere, including: "Zimbabwean Instrument Makers, Musicians and Healers" by Tendai Ziyambe (presenting four makers of flutes, mbira, drums, and musical bows), "Thomas Gora Wadharwa" by Chicago Dzviti (profile of a Zimbabwean mbira maker and player), "The Art & Craft of Building Marimbas" by Stephen Smith Golovnin (one of a series of columns on the subject), and "One Builder's Notes on Mbira Construction" by Andy Cox.

Folk Harp Journal (4718 Maychelle Dr., Anaheim, CA 92807-3040) has released a detailed index covering the magazine's last fifteen years, with subject matter headings and author headings. At a hundred pages long, the index serves as road map to an impressive body of material. EMI readers may want to check the "Plans and Instructions" heading, or any number of others.

Club MIDI is a new magazine/newsletter devoted to music making with the MIDI musical instrument computer code. Contact PO Box 1335, Manchester CT 06040.

Woodwind Quarterly #6, Feb 1994 (1513 Old CC Rd., Colville WA 99114) includes a range of articles on woodwind making, including –

"Talking with Sandy Drelinger", by Scott Hirsch: an interview with a specialist in flute head joint making, containing lots of technical information.

"Making the American Indian Flute," by Harry Brown: a how-to on making flutes in the style of the plains Indians.

"Tune It or Die: an Acoustic Perspective for Technicians," by Lawrence McCoy: a short exposition of the compromises involved in tempered tuning, and their implications for tuning of woodwind instruments.

"New Designs and Materials in Oboe Manufacture," by Nora Post: Transcription of remarks from a panel discussion among technicians for several leading manufacturers of oboes. The discussion took place at an event titled "Oboe Blowout New York."

"Making a Renaissance Style Flute," by Scott Hirsch: How-to for early flute making, with a generalized, rather than narrowly prescriptive, approach.

The following is a listing of selected articles relating to musical instruments which have appeared recently in other publications.

"Do Violin Makers Need Theorems?" by Richard Sacksteder, in **CAS Journal** /vol 2 #6 (Series II), Nov 1994 (112 Essex Ave., Montclair, NJ 07042).

An essay, both thoughtful and humorous, on the role of mathematics in musical instrument design, with due consideration to the human element in the way this question plays out in the real world.

Also in **CAS Journal** for November 1994: Articles on anomalous bowed string tones appearing well below the plucked string fundamental, violin top and back plate vibration patterns and physical properties, resonant properties and transmission of vibrations in violin bridges, and more.

"Automatic Music", in **Logosblad** 16 #10, October 1994 (Kongostraat 35, 9000 Gent, Belgium)

Notes on each of four composer/builders who took part in an automatic instruments festival at Stichtung Logos in Gent in October, including Trimpin, Jacques Remus, Norman Andersen and Daniel Carney. In Dutch.

"Some Thoughts on the Subject of Quilling", by Kieth Hill, in **Continuo**, October 1994 (PO Box 327, Hammondsport, NY 14840).

How-to for preparing and installing harpsichord quills, with discussions of plastic vs. natural quill, and plectra mechanics in general.

"Notes on the Stradivarius Saw" by Luther Harris, in **Musical Saw News** #22, Nov 1994 (PO Box 84935, San Diego, CA 92138-4935)

A critique of one of the commercially available brands of musical saw, with comments on how the saw can be altered to change the playing characteristics.

"Des Xylophones D'Afrique", in **Percussions** no. 37, Nov/Dec 1994 (18, Rue Theodore-Rousseau, F-77930 Chailly-en-Bierre, France).

A bibliography of books and articles relating to African xylophones. In French, but many of the titles listed are in English.

"Si Darius and Si Madeleine" by Michel Faligand, also in **Percussions** Nov/Dec 1994 (address above).

Notes and drawings on the American gamelan instrument sets created by Lou Harrison & Bill Colvig, with bibliography. In French.

"Steel Drum: Aspects Historiques" by Emmanuel Masselot, also in **Percussions** Nov/Dec 1994 (address above).

History of the development of steel drum in Trinidad.

"UAKTI: A Legend Revived in the Mountains of Minas" by Christopher Dunn, in **Rhythm Music Magazine** Vol. III #11 (872 Mass Ave 2-7, PO Box 391894, Cambridge, MA 02139).

A report on the Brazilian group UAKTI, which has been successful in reaching large audiences with an orchestra of invented instruments including percussion aerophones and various other types.

Leonardo Volume 27 #5 (MIT Press Journals, 55 Hayward St., Cambridge, MA 02142-9902) is a special issue on art, science and technology in the former Soviet Union. Among the articles –

"Musical Light-Painting and the Phenomenon of Form-Movement" by Yury Alekseyevich Pravdyuk: The founder of the Hall of Musical Light-Painting in the Kharkov discusses the work done there and the equipment they have developed for realizing light-music.

"A Hierarchical Theory of Aesthetic Perception: Musical Scales", by Pavel B. Ivanov: A theory for the development and analysis of musical scales, considering both fundamental pitch relationships and overtone content.

"Beating a Fractal Drum: How a drum's shape affects its sound" by Ivars Peterson, in Science News Vol. 146.

"The study of the vibration of drums with fractal boundaries and drums with fractal membranes ... [has] significant physical applications to the study of porous media and to that of diffusion or wave propagation on fractals." This article is a study not so much of drums, but of vibrational patterns for hypothetical drums with irregular, mathematically-defined membrane shapes, as models for wave propagation and reflection in non-musical technical applications.

"The Tiple" in **American Lutherie"** #39, Fall 1994 (8222 S Park Ave., Tacoma, WA 98408-5226).

Plans for making this small Spanish and Latin American guitar-like instrument.

"Exploded View: The Musical Instrument at Twilight" by Nicolas Collins, in **Resonance** Volume 3 #1, Winter 1994 (LMC, 2nd Floor, Community Music House, 60 Farringdon Rd., London EC1R 3BP, England).

An interpretive history of sound technology from phonograph to MIDI, with an emphasis on how MIDI potentially transforms the relationship between composer, performer, instrument & audience. Includes some information and photos on contemporary makers of idiosyncratic technology-based sound devices.

"All the News That's Fit to Sample," interview with Phil England by Bob Ostertag, also in **Resonance** Vol. III #1 (address above).

Phil England talks about his home-grown sound-manipulation work (electronic effects, tape manipulation, sampling).

"The Scratch Orchestra: 25th Anniversary" by Michael Parsons, also in **Resonance** (address above).

The Scratch Orchestra came into being as an affiliation of composers, improvisers and sound-conceptualizers in London in 1969. After the group disbanded in 1974, this article accurately observes, "the currents of thought and activity from the earlier period continued to flourish in different contexts." The article provides history as a backdrop to a November 1994 commemoration event.

"Zgamoniums: A Short Exposition of ZGA's instruments," in **Unfiled: Music Under New Technology** [otherwise known as ReR/Recommended Sourcebook 0401, a manifestation of the **ReR Quarterly**](74 Tulsa Hill, London, England SW2 2PT).

Photographs and diagrammatic drawings of instruments

(Continued on page 43)